California Regional Water Quality Control Board
Santa Ana Region

September 17, 2004

Item: 13

Subject: **Public Workshop: Proposed Basin Plan Amendment – Incorporation of Total Maximum Daily Loads for Nutrients for Lake Elsinore and Canyon Lake**

DISCUSSION

On May 21, 2004, staff of the California Regional Water Quality Control Board, Santa Ana Region (Regional Board) issued a staff report entitled "Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Loads". The report proposed that the Regional Board consider amendment of the Implementation Plan of the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) to incorporate the proposed TMDLs, which require actions to reduce nutrient discharges to Lake Elsinore and Canyon Lake.

On June 4, 2004, the Regional Board held a public workshop to receive evidence and testimony on the proposed Lake Elsinore and Canyon Lake Total Maximum Daily Loads (TMDLs). Based on both written and oral comments received from the public, staff have revised the proposed TMDLs (Attachment A to Tentative Resolution No. R8-2004-0037). Attachment B contains staff responses to comments received prior to, during and after the June 4, 2004 public workshop. Copies of the written comments are included in Attachment D.

Attachment B includes comments received from Dr. Michael Josselyn, who provided the requisite scientific peer review. It should be noted that Dr. Josselyn found no significant flaws in the technical approach used to develop the proposed TMDLs (see Comments 93 – 104).

The Board will conduct an additional public workshop on September 17, 2004 to receive further testimony on the revised TMDLs. A public hearing to consider the adoption of the proposed TMDLs as a Basin Plan amendment is scheduled for the December 17, 2004 Board meeting.

In summary, the proposed TMDLs include:

- Interim and final numeric targets;
- Wasteload Allocations (WLAs) for point source discharges and Load Allocations (LAs) for nonpoint source discharges;
- An Implementation plan and schedules for compliance with the TMDLs, numeric targets, WLAs and LAs; and,
- A monitoring plan and schedule to assess the effectiveness of the TMDLs.

Based on the comments received on the proposed nutrient TMDLs, staff proposes the following major changes to the TMDLs/Basin Plan Amendment.

<u>Revisions to the interim and final numeric targets for nitrogen, and</u>
<u>Revisions to the nitrogen TMDLs, WLAs and LAs</u>
In the May 2004 TMDL Report, staff originally proposed total nitrogen numeric targets based on a 10:1 total nitrogen (TN) to total phosphorus (TP) ratio. Based on comments received

regarding nitrogen and phosphorus limitation (see Attachment B, Comments 54 and 79) staff proposes to revise the nitrogen targets using a TN to TP ratio of 15:1. The interim and final total phosphorus targets proposed for both Lake Elsinore and Canyon Lake are 0.1 and 0.05 mg/L, respectively. The interim and final total nitrogen targets initially proposed were 1 mg/L and 0.5 mg/L, respectively. The re-calculated interim and final total nitrogen targets now proposed, based on the 15:1 ratio, are 1.5 and 0.75 mg/L, respectively. The revised targets are shown in Table 5-9n in Attachment A to Tentative Resolution No. R8-2004-0037.

These re-calculated total nitrogen targets were then used to re-calculate the total nitrogen load capacity (TN TMDL) to Lake Elsinore and Canyon Lake using a simple mass loading formula:

TN load capacity = Inflow * TN target

To meet the revised proposed interim total nitrogen numeric target, the calculated total nitrogen load capacity is greater than the simulated existing nitrogen loads. Thus, there is no apparent need for interim total nitrogen targets, or interim total nitrogen WLAs and LAs. Therefore, staff proposes to specify only a final total nitrogen target of 0.75 mg/L, to be achieved in both lakes as soon as possible, but no later than 2020.

Using the revised final total nitrogen targets, the total nitrogen load capacity was also re-calculated using the equation shown above. In turn, using the revised total nitrogen load capacity, the final total nitrogen WLAs and LAs were re-calculated for both lakes. The revised nitrogen TMDLs, WLAs, and LAs are shown in Tables 5-9q and 5-9r in Attachment A to Tentative Resolution No. R8-2004-0037.

Ammonia Numeric Targets, TMDLs, WLAs, LAs; Consideration of Site-Specific Objectives for Un-ionized Ammonia

In the May 2004 TMDL Report, Section 4.3, staff indicated that the US EPA national ammonia criteria (acute and chronic) would serve as final ammonia numeric targets, to be met no later than 2020. However, these numeric targets were inadvertently omitted from the proposed Basin Plan Amendment. Staff has corrected this oversight in the revised proposed Basin Plan amendment. The recommended ammonia numeric targets are consistent with US EPA's national criteria and are intended to protect against ammonia toxicity. This addition is shown in Table 5-9n in Attachment A to Tentative Resolution No. R8-2004-0037.

The inclusion of these numeric targets also reflects consideration of comments by two parties (see Attachment B, Comments 54 and 93). One of these parties, Dr. Josselyn, the scientific peer reviewer, suggested that it might be more appropriate to propose a TMDL for ammonia, rather than for nitrogen, to reduce potential ammonia toxicity. Staff does not propose to establish ammonia TMDLs, WLAs or LAs to meet the proposed ammonia numeric targets because of the significant complexity of ammonia and nitrogen dynamics in the lake systems. The EPA ammonia criteria are temperature and pH-dependent and the nitrogen cycling processes in the lakes are not well understood. Therefore, it is not feasible to determine ammonia TMDLs and allocations at the present time. The proposed total nitrogen TMDL, WLAs and LAs should ensure compliance with the ammonia numeric targets. Staff also recommends that the Review and Revision of Water Quality Objectives

task proposed in the TMDL implementation plan (now included as Task 12) be revised to include evaluation of the need for site-specific un-ionized ammonia objectives.

Revision of Dissolved Oxygen Targets

It was suggested (see Attachment B, Comment 71) that the dissolved oxygen (DO) target should be revised to 5 mg/L throughout the water column. The commenter indicated that high benthic DO would reduce fish kills and reduce the release of toxic ammonia.

Based on consideration of this comment, staff proposes to revise the DO targets initially recommended. As shown in Table 5-9n of Attachment A to Tentative Resolution No. R8-2004-0037, the final DO target for Lake Elsinore and the interim DO target for Canyon Lake would be revised to delete references to the 2mg/L concentration goal. The Basin Plan specifies that the dissolved oxygen for waterbodies designated WARM, including Canyon Lake and Lake Elsinore, shall not be depressed below 5 mg/L. The Basin Plan does not identify the depth over which compliance with this objective is to be achieved, nor does it reflect seasonal differences that may result in DO variations associated with stratification in the lakes. The revised proposed targets are consistent with the Basin Plan DO objective and take into account the conventional sampling protocol (i.e., dissolved oxygen is measured at 1 m intervals). The revised targets also reflect uncertainty about the efficacy of proposed aeration projects, and about the degree to which nutrient reductions will result in dissolved oxygen increases. As the relationship between nutrient input and dissolved oxygen levels in the lakes is better understood, the TMDL targets for dissolved oxygen can be revised appropriately to ensure protection of aquatic life beneficial uses.

Revisions to compliance dates for certain dischargers.

Based on comments received (Attachment B, Comments 16 and 21), staff proposes to modify the compliance dates for proposed implementation plan requirements for on-site disposal systems (Section E. TMDL Implementation, Task 5), and urban dischargers, including Caltrans, March Air Reserve Base and the MS4 permittees (municipalities and Riverside County) (Task 6). Revision of these compliance dates would allow additional time for these dischargers to develop appropriate plans, develop agreements, work within their fiscal budgeting process, etc. These revised compliance dates are shown in Table 5-9s in Attachment A to Tentative Resolution No. R8-2004-0037.

Addition of pollutant trading language

Comments were received concerning pollutant trading (Attachment B, Comments 18 and 57). It was suggested that the TMDLs should include a pollutant trading framework that specifically addresses critical questions such as credit banking and tracking. It was also suggested that pollutant trading proposals should be approved by the Regional Board, based on the evaluation of whether water quality improvements are demonstrated.

Board staff supports pollutant trading programs that result in meaningful water quality/beneficial use improvements. We believe that responsible parties can work on projects that directly benefit conditions in the lakes, in lieu of implementing costly projects in the upper watershed area. Staff believes that the stakeholders in the watershed should be responsible to develop pollutant trading proposals/programs that take into account the critical issues, such as credit banking and tracking. Staff proposes that Section E. TMDL Implementation of the proposed amendment be revised to include a specific task for the responsible agencies to develop a pollutant trading plan (new Task 11). Language

acknowledging pollutant trading as an option for meeting allocations, has also been added to the requirements specified for agricultural dischargers (Task 4), on-site disposal systems (Task 5), urban dischargers (Task 6), Forest Area (Task 7) and development of a Lake Elsinore Sediment nutrient reduction plan (Task 8). Finally, additional language in each of these Tasks is proposed to specify that all pollutant trading proposals must be approved by the Regional Board.

Monitoring Program Requirements – Flexibility Language Added
It was recommended that flexibility be allowed to move or remove monitoring stations, rather than the prescriptive approach proposed in Section E. TMDL Implementation, Task 3 of the amendment (Attachment B, Comment 39). In response to this comment, staff proposes that language be added to the monitoring program requirements in Task 3 that would allow the responsible parties to propose alternative monitoring stations, in lieu of one or more of those identified in the amendment for consideration. Any proposed modifications to the list included in the proposed Basin Plan amendment would need to be adequately justified.

Modifications to Task 5 – On-site Septic Systems Management Plan Requirements
The Riverside County Flood Control and Water Conservation District suggested (Attachment B, Comment 21) that it is premature to impose the requirements regarding on-site septic systems management (proposed in Section E. TMDL Implementation, Task 5) since the State Water Resources Control Board has not adopted the regulations required under AB885[1]. Staff agrees and recommends modifying the compliance date for implementation of the proposed Septic System Management Plan requirements to reflect uncertainties regarding the date of adoption of the AB885-required regulations and the completion of agreements, if required, between the Regional Board and Riverside County to implement the regulations.

Additional Cost Information Associated with the Implementation of the Nutrient TMDLs for Lake Elsinore and Canyon Lake

Comments were received from various parties regarding the economic implications of the proposed TMDLs (Attachment B, Comments 3, 7, 12, 23, 35, 36, 53, 61, 66, 68, 69, 83, 85, 89, 91). Staff has responded to these comments in detail. The comments focus largely on the arguments that 1) a cost-benefit analysis needs to be completed when establishing the TMDLs, and 2) establishing numeric targets in the TMDLs is essentially equivalent to setting water quality objectives, for which analysis of the factors specified in Water Code Section 13241 is required. The Section 13241 factors include economics. It was also suggested that priorities should be established so that funds are expended where they will have the most water quality benefit. And it was recommended that the cumulative costs of multiple TMDLs, and the ability of stakeholders to provide the requisite funds to implement them, needed to be considered.

Board's staff certainly agrees that TMDL implementation efforts should be focused on nutrient reduction projects on a priority basis. This type of strategy can be proposed by the watershed

[1] AB 885 amended the California Water Code to add Section 13290 – 13290.7 to require the State Board, in conjunction with the State Department of Health Services, the California Coastal Commission and county and/or city environmental health agencies to adopt regulations for the permitting, maintenance, monitoring and oversight of on-site disposal systems. The State Board is currently in the process of working with various stakeholders to develop the appropriate regulations.

stakeholders, either collectively or individually, as they develop their proposed implementation programs (see Response to Comment 61). Staff also acknowledges the cumulative cost and effort that may be required to address all the TMDLs required in the watershed. The fact that work on these nutrient TMDLs has proceeded in advance of other TMDLs (within and outside of this watershed) reflects the priority that the Board has assigned to this problem. In proceeding with work on other TMDLs required in the watershed, Board staff will make every effort to assure that the future TMDLs are complimentary and do not impose redundant or unnecessary requirements. Also, the nutrient TMDLs proposed include 10 and 15 year compliance schedules in part to allow stakeholders to identify funding solutions.

With regard to the major economics issues raised (items 1 and 2, above) it is worth reiterating staff's responses (see, in particular, the responses to Comments 3 and 68). First, federal law mandates that TMDLs be set at a level that will ensure attainment of the existing water quality standards. The economic feasibility to the dischargers of achieving the standards is neither relevant nor authorized when setting the TMDL. Second, numeric targets are not water quality standards. They are an interpretation of existing water quality standards. Thus, analysis of the factors specified in Section 13241 is not required when establishing the targets or TMDLs.

While economic considerations are not relevant in establishing TMDLs that will achieve water quality standards, the Regional Board does have specific obligations to consider economics related to the adoption of the TMDLs in the Basin Plan. These obligations do not require a cost-benefit analysis. As discussed in the May 2004 TMDL Report, Section 13141 of the California Water Code requires the Regional Board to estimate the cost and identify potential financing sources for any proposed agricultural water quality control program. Potential agricultural costs are discussed below; funding sources for implementation of agricultural programs were discussed in the May 2004 staff report.

As was also discussed in the May 2004 TMDL Report, the California Environmental Quality Act (CEQA) requires that the Board consider the environmental effects of reasonably foreseeable methods of compliance with Basin Plan amendments that establish performance standards or treatment requirements, such as TMDLs. The costs of the methods of compliance must be considered in this analysis. Staff indicated in the TMDL Report that this cost information would be solicited from the stakeholders. In response to this request, the Riverside County Flood Control and Water Conservation District (RCFCD) and Eastern Municipal Water District provided cost information at the June 4, 2004 public workshop. RCFCD provided this information in writing as well. In addition to the information provided by the Riverside County Flood Control and Water Conservation District and EMWD, staff also compiled additional information on compliance methods and potential costs for agriculture and urban nutrient sources.

Implementation of agricultural water quality control programs includes both development of an agricultural nutrient management plan and implementation of specific Best Management Practices (BMPs) to reduce nutrients. Potential cost estimates for the development of a nutrient management plan (including providing technical assistance, testing of soils, manure, and plant tissues) are estimated at $5 per acre for basic service up to $30 per acre for extensive consultation on high value crops. (US EPA, 2003).

Table 1 summarizes costs for the implementation of the following management practices to control nutrient runoff based on data and information from the Chesapeake Bay Area. Many of

these control measures can be used for control of agricultural nutrient releases, as well as nutrient releases from other sources.

Table 1. Agriculture Nutrient Reduction BMP Costs

BMP	Median Annual Costs ($ per acre per year)	Practical Life Span of BMP (years)
Nutrient management	$2.40	3
Strip-cropping	$11.60	5
Diversion	$52.09	10
Sediment Retention Water Control Structures	$89.22	10
Grassed Filter Strips	$7.31	5
Cover Crops	$10.00	1
Permanent Vegetative Cover on Critical Areas	$70.70	5
Conservation Tillage	$17.34	1
Grassed Waterways	$1.00	10
Animal Waste System	$3.76	10

Source: US EPA, 2003

Cost estimates for implementing urban water quality control management practices were compiled from US EPA's Urban Storm Water BMP document. The typical base capital construction costs for BMPs, assuming a base year of 1997, are shown in Table 2.

Table 2. Urban Nutrient Reduction BMP Costs

BMP	Typical Costs ($ per cubic feet of runoff)
Constructed Wetland	$0.60-1.25
Infiltration Trench	$0.60-1.25
Infiltration Basin	$0.60-1.25
Sand Filter	$0.60-1.25
Bioretention	$0.60-1.25
Retention and Detention Basins	$0.50-1.00
Grass Swale	$0.60-1.25
Filter Strip	$0.60-1.25

Source: US EPA, 1999

For treating urban runoff, RCFCD provided estimates based on reducing nutrient levels through implementing wetland treatment. Costs for land acquisition alone are estimated at $18,000,000 up to $84,000,000,000. (see more discussion of these costs in the RCFCD comment letter in Attachment D and Attachment B (Response to Comments), Comments 2 and 13).

To reduce nutrient levels in recycled water discharges to meet the proposed numeric targets, EMWD estimated the cost to be $37,000,000. However, as discussed in the Attachment B Comment 69, staff believes that the most accurate costs for treating recycled water are reflected in the LESJWA studies discussed below.

Recently, the Lake Elsinore and San Jacinto Watershed Authority (LESJWA) funded several studies to investigate potential projects to improve the water quality of Lake Elsinore and Canyon Lake. These studies include the "Lake Elsinore Nutrient Removal Study" by CH2MHill (2004), the "Lake Elsinore and Canyon Lake Nutrient Management Plan" by Tetra Tech (2004)", and the "Draft Lake Elsinore Fisheries Management Plan" by EIP Associates (2004). These studies identify potential projects that are beneficial to lake water quality improvement, and include the estimated costs associated with each potential project.

Table 3 lists the project alternatives identified by CH2MHill in the Nutrient Removal Study. It should be emphasized that the focus of this study was to identify potential strategies for removal of nutrients (primarily phosphorus) in the reclaimed water used to supplement low lake levels in Lake Elsinore. Thirteen (13) project alternatives, including treatment wetlands, biological and physical-chemical treatment technologies, were evaluated. Of the 13 alternatives, a Preferred Project Alternative (PPA) based on a cost benefit analysis and stakeholder input, was identified. The amount of phosphorus removed by the alternatives ranges from 20,000 to 58,000 lbs (9,080 to 26,332 kg). To meet the proposed interim WLA for supplemental water, removal of 11,612 kg of phosphorus is needed; to meet the proposed final WLA, removal of 14,139 kg of phosphorus is required – both amounts are within the achievable range identified by CH2MHill for 12 of the 13 alternatives (note that phosphorus removal is not applicable to the imported water alternative – Alternative 7).

Table 3. Lake Elsinore Nutrient Removal Study Project Alternatives and Cost Estimates

Alternative	Facility Description	Estimated Construction Cost	Estimated Capital Cost Totals	Estimated Annual O&M Cost ($/yr)
1A	Chemical Phosphorus Treatment at RWRFs (EMWD & EVMWD)	$3,534,000	$4,418,000	$311,000
1B	Biological Phosphorus Treatment at RWRFs (EMWD & EVMWD)	$8,877,000	$11,096,000	$295,000
2A	350-Acre Back Basin Treatment Wetland	$19,621,000	$24,526,000	$1,510,000
2B	EVMWD RWRF Chemical Phosphorus Treatment and 350-Acre Back Basin Treatment Wetland	$12,180,000	$15,225,000	$1,640,000
3A	600-Acre Back Basin Treatment Wetland	$18,169,000	$22,711,000	$2,243,000
3B	EVMWD RWRF Chemical Phosphorus Treatment and 600-Acre Back Basin Treatment Wetland	$20,997,000	$26,246,000	$5,581,000
4	350-Acre Littoral Treatment Wetland	$18,622,000	$23,278,000	$710,000
5A	Remote Treatment at EVMWD RWRF	$12,779,000	$15,974,000	$553,000
5B	Remote Treatment at Lake Elsinore	$19,985,000	$24,981,000	$598,000
6	Calcium Treatment at Lake Elsinore	$8,084,000	$10,105,000	$362,000
7	Imported Water	$0	NA	$5,994,000
8A	Chemical Phosphorus Treatment at EVMWD RWRF, Imported Water and 107-Acre Treatment Wetland	$6,749,000	$8,436,000	$767,000
8B	Chemical Phosphorus Treatment at EVMWD RWRF, Remote Granular Filtration and 107-Acre Treatment Wetland	$12,296,000	$15,370,000	$850,000
PPA	Island wells, 107 acre Back Basin treatment wetland, chemical treatment of reclaimed water, etc.,	$12,737,000	$15,921,000	$728,000

Source: (CH2MHill, 2004)

As discussed in the May 2004 TMDL Report, Tetra Tech Inc. received funding from LESJWA to develop the Lake Elsinore and Canyon Lake Nutrient Management Plan (NMP). Nineteen projects were identified in the NMP (Table 4). Potential projects include continued watershed and in-lake monitoring and development of specific project plans. Note that for most of the projects, actual construction and capital costs are not known at this time. Actual projects can only be identified as data gaps are filled and as the hydrology and nutrient source dynamics in the San Jacinto River Watershed are better understood.

Table 4. San Jacinto Nutrient Management Plan Projects and Cost Estimate

Project Alternative	Project Description	Estimated Construction Cost	Estimated Capital Cost	Estimated Annual O&M Cost ($/yr)	Project Cost[a]
1	Lake Elsinore In-Lake Nutrient Treatment	**See Table 1 (in Tetra Tech Report)**			
2	Lake Elsinore Destratification		$1,800,000	$150,000	
2A	Lake Elsinore Aeration		$1,300,000	$100,000	
3	Aeration/Destratification of Canyon Lake		$400,000	$35,000	
4	Dredging of Canyon Lake		$2,500,000		
5	Water Quality Monitoring at Lake Elsinore			$200,000	
6	Development of a Dynamic Water Quality Model of Lake Elsinore				$100,000
7	Water Quality Monitoring at Canyon Lake			$200,000	
8	Development of a Dynamic Water Quality Model of Canyon Lake				$83,000
9	Structural Urban BMPs (in Hemet and Moreno Valley)*				$110,000
10	Sewer and Septic Improvements				
11	Control of Trash in the San Jacinto River (including the acquisition of approximately 300 acres for habitat protection)				$6,139,000
12	Interception and Treatment of Nuisance Urban Runoff (study)				$150,000
13	Riparian Habitat Restoration and Development of Agricultural Buffers				$150,000
13A	Salt Creek from Lindenberger Rd to Winchester Area				$80,000

Project Alternative	Project Description	Estimated Construction Cost	Estimated Capital Cost	Estimated Annual O&M Cost ($/yr)	Project Cost[a]
13B	Perris Valley Storm Drain				$100,000
13C	San Jacinto River				$60,000
14	Determination of Crop-Specific Agronomic Rates for Guidance in Fertilizer and Manure Application Management				$120,000
15	Assessment of Nutrient Loads to the San Jacinto Watershed as a Result of Flooding in Agricultural Areas				$200,000
16	Regional Organic Waste Digester (feasibility study)				$300,000
17	Development of a Pollutant Trading Model				$250,000
18	Data Collection for Mystic Lake to Support Development of Future Projects				$250,000
19	Continued Monitoring of Streamflow and Water Quality Throughout the Watershed			$250,000	

Source: Tetra-Tech, 2004

[a] The cost estimates are for study and project plan development only.

* The cost to develop 30% design plan and construction cost estimates for 3 high priority urban BMPs is approximately $50,000. Second phase completion of the design plans, along with more detailed cost estimates is approximately $60,000.

Finally, EIP Associates developed a Fisheries Management Plan aimed at providing a strategy for improving and enhancing sport fishing in Lake Elsinore. The Draft Fisheries Management Plan identified measures including carp removal, carp control, fish stocking, enhancing lake spawning and rearing habitats, and monitoring. These measures would provide additional nutrient reductions in Lake Elsinore. For example, carp removal and control reduces sediment re-suspension and subsequent nutrient release from the lake sediment. Even though the amount of phosphorus that may be reduced by fisheries management has not yet been quantified for Lake Elsinore, a literature review indicates that there is a linear relationship between carp population and phosphorus release rates (Lougheed V.L., et. al., 1988). EIP Associates estimates that the total cost to implement fishery enhancement measures is $2,560,200 of which carp removal costs are $780,000 (EIP Associates, 2004).

Costs Associated with Impacts of Nutrient Discharges

As discussed in the May 2004 TMDL Report, fish kills resulting from elevated inputs of nutrients have long plagued Lake Elsinore. Canyon Lake has also been impacted by elevated nutrient levels. As a result, the Regional Board added both Lake Elsinore and Canyon Lake to the 303(d) list of impaired waterbodies, thereby prompting the need to address nutrients via the establishment of TMDLs. At the June 4, 2004 public workshop, several agencies expressed

concern about the benefits to the community if the TMDL were to be adopted, given the potential costs for implementation of reduction strategies (Comments 3, 7, 14, 35, 36, 61, 68, 69, 87 and 91). While a cost-benefit analysis is not required, the following information concerning the costs of failure to implement nutrient controls is provided to assure a broad perspective of the total costs to the community.

The impact of excessive nutrient loading to the communities of Canyon Lake and Lake Elsinore can be substantial, particularly if there is a fish kill. Tangible costs include those costs to collect and dispose of dead fish. As an example, in August of 2003, a fish kill occurred in Lake Elsinore, most likely due to low dissolved oxygen levels, high water temperatures and elevated ammonia concentrations. LESJWA spent approximately $17,000 to collect and dispose of the fish. The city of Lake Elsinore also estimates that costs including labor and disposal range between $0.15 to $0.20 per pound of fish. For the 200 ton fish kill that occurred in 1998, costs for clean-up ranged between $60,000 to $80,000.

Further, when a fish kill occurs, there are also intangible costs associated with the impacts. Lake Elsinore receives local and/or statewide publicity usually only when there is a massive fish kill. City staff indicate that the actual direct cost cleanup from a fish kill is probably minor compared to the wider indirect economic loss to development and overall Lake use. They note that when a fish kill occurs, use at Lake Elsinore decreases in comparison to Lake Perris (Kilroy, personal communication). As a result, businesses in Lake Elsinore, including restaurants and boating and fishing suppliers, lose considerable revenue when people choose not to recreate in Lake Elsinore because of fish kills and/or because of the significant algae blooms.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) REQUIREMENTS

The basin planning process has been certified by the Secretary of Resources as functionally equivalent to the requirement for the preparation of an Environmental Impact report or Negative Declaration. The Regional Board is required to complete an environmental assessment of any changes the Board proposes to make to the Basin Plan. Staff prepared an Environmental Checklist (Attachment B to the May 2004 TMDL Report), determining that there would be no significant adverse environmental impacts from the proposed Basin Plan Amendment. Based on comments received, staff has revised the environmental checklist to indicate that there may be environmental impacts to aesthetics and/or biological resources if certain urban discharge projects are implemented (Attachment C). However, any such impacts from specific projects would be subject to a complete environmental review.

STAFF RECOMMENDATION

Direct staff to prepare a Basin Plan amendment and related documentation to incorporate the TMDLs for nutrients for Canyon Lake and the Lake Elsinore that are shown in Attachment A to Tentative Resolution No. R8-2004-0037 for consideration at a future public hearing.

ATTACHMENTS

Attachment A – Tentative Resolution No. R8-2004-0037, with attached proposed (revised) Basin Plan amendment

Attachment B – Responses to comments received from the scientific peer reviewer and from the public
Attachment C – Environmental Checklist
Attachment D – Comment Letters

REFERENCES

US EPA, National Management Measures for the Control of Nonpoint Pollution from Agriculture (EPA – 841-B-03-004), 2003

US EPA, Urban Storm Water Best Management Practices (EPA – 821-R-99-012), 1999.

CH2MHill, Lake Elsinore Nutrient Removal Study, April 2004.

Tetra-Tech Inc., San Jacinto Nutrient Management Plan, May 2004.

EIP Associates, Fisheries Management Plan for Lake Elsinore, Riverside County, Draft, May 2004.

Lougheed V.L., Crosbie B, and Chow-Fraser P., Predictions on the Effect of Common Carp (*Cyprinus carpio*) Exclusion on Water Quality, Zooplankton, and Submergent Macrophytes in a Great Lakes Wetlands. Can. J. Fish. Aquat Sci. 55 (5): 1189-1197, 1998.

Kilroy, Pat, Personal Communication, August 2004.

ATTACHMENT A

Resolution No. R8-2004-0037

To be submitted at a later date

ATTACHMENT TO RESOLUTION NO. R8-2004-0037

(Changes to the May 2004 version of the proposed Basin Plan amendment are shown as ~~strikeout~~ for deletions and underline for additions)

Amendment to the Santa Ana Region Basin Plan

Chapter 5 - Implementation Plan

(NOTE: The following language is proposed to be inserted into Chapter 5 of the Basin Plan. If the amendments are approved, corresponding changes will be made to the Table of Contents, the List of Tables, page numbers, and page headers in the plan. Due to the two-column page layout of the Basin Plan, the location of tables in relation to text may change during final formatting of the amendments. For formatting purposes, the maps may be redrawn for inclusion in the Basin Plan, and the final layout may differ from that of the draft.)

Lake Elsinore/San Jacinto River Watershed

The Lake Elsinore/San Jacinto River Watershed is located in Riverside County and includes the following major waterbodies: Lake Hemet, San Jacinto River, Salt Creek, Canyon Lake and Lake Elsinore. The total drainage area of the San Jacinto River watershed is approximately 782 square miles. Over 90 percent of the watershed (735 square miles) drains into Canyon Lake. Lake Elsinore is the terminus of the San Jacinto River watershed. The local tributary area to Lake Elsinore, consisting of drainage from the Santa Ana Mountains and the City of Lake Elsinore, is 47 square miles.

Land use in the watershed includes open/forested, agricultural (including concentrated animal feeding operations such as dairies and chicken ranches, and irrigated cropland), and urban uses, including residential, industrial and commercial. Vacant/open space is being converted to residential uses as the population in the area expands. The municipalities in the watershed include the cities of San Jacinto, Hemet, Perris, Canyon Lake, Lake Elsinore and portions of Moreno Valley and Beaumont.

1. Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Load (TMDL)

Lake Elsinore and Canyon Lake are not attaining- water quality standards due to excessive nutrients (nitrogen and phosphorus). Reports prepared by Regional Board staff describe the impact nutrient discharges have on the beneficial uses of Lake Elsinore and Canyon Lake [Ref. #1, 2] Lake Elsinore was formed in a geologically active graben area and has been in existence for thousands of years. Due to the mediterranean climate and watershed hydrology, fluctuations in the level of Lake Elsinore have been extreme, with alternate periods of a dry lake bed and extreme flooding. These drought/flood cycles have a great impact on lake water quality. Fish kills and excessive algae blooms have been reported in Lake Elsinore since the early 20th century. As a result, in 1994, the Regional Board placed Lake Elsinore on the 303(d) list of impaired waters due to excessive levels of nutrients and organic enrichment/low dissolved oxygen.

Canyon Lake, located approximately 2 miles upstream of Lake Elsinore, was formed by the construction of Railroad Canyon Dam in 1928. Approximately 735 square miles of the 782 square mile San Jacinto River watershed drain to Canyon Lake. During most years, runoff from the watershed terminates at Canyon Lake without reaching Lake Elsinore, resulting in the buildup of nutrients in Canyon Lake. While Canyon Lake does not have as severe an eutrophication problem as Lake Elsinore, there have been periods of algal blooms and anecdotal reports of occasional fish kills. Accordingly, in 1998, the Regional Board added Canyon Lake to the 303(d) list of impaired waters due to excessive levels of nutrients.

A TMDL technical report prepared by Regional Board staff describes the nutrient related problems in Canyon Lake and Lake Elsinore in greater detail and discusses the technical basis for the TMDLs that follows [Ref. # 3].

A. Lake Elsinore and Canyon Lake Nutrient TMDL Numeric Targets

Numeric targets for Lake Elsinore and Canyon Lake are based on reference conditions when beneficial uses in the lakes were not significantly impacted by- nutrients. ~~As shown in~~ Table 5-9n shows~~,~~ both "causal" and "response" interim and final numeric targets ~~are specified~~ for both lakes. Causal targets are those for phosphorus and nitrogen. Phosphorus and nitrogen are ~~is~~ the primary limiting nutrients in Lake Elsinore and Canyon Lake, respectively. However, under certain conditions, nitrogen may be limiting in Lake Elsinore and phosphorus may be limiting in Canyon Lake. ~~and Canyon Lake, and nitrogen can be a limiting nutrient under certain conditions~~ Targets for both nutrients are therefore necessary. Reduction in nitrogen inputs will be necessary over the long-term and only final targets are specified. –Response targets include chlorophyll *a* and dissolved oxygen. These targets are specified to assess water quality improvements in the lakes. Finally, ammonia targets are specified to prevent un-ionized ammonia toxicity to aquatic life.

Table 5-9n
Lake Elsinore and Canyon Lake Nutrient TMDL Numeric Targets*

Indicator	Lake Elsinore	Canyon Lake
Total P concentration (Interim)	Annual average no greater than 0.1 mg/L; to be attained no later than 2015	Annual average no greater than 0.1 mg/L; to be attained no later than 2015
Total P concentration (Final)	Annual average no greater than 0.05 mg/L; to be attained no later than 2020	Annual average no greater than 0.05 mg/L; to be attained no later than 2020
~~Total N concentration (Interim)~~	~~Annual average no greater than 1.0 mg/L; to be attained no later than 2015~~	~~Annual average no greater than 1.0 mg/L; to be attained no later than 2015~~
Total N concentration (Final)	Annual average no greater than ~~0.5~~ 0.75 mg/L; to be attained no later than 2020	Annual average no greater than ~~0.5~~ 0.75 mg/L; to be attained no later than 2020
Aammonia nitrogen concentration (Final) [Ref. #4]	Calculated~~Specified~~ ??concentrations to be attained no later than 2020 Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411/(1+10^{7.204-pH}) + 58.4/(1+10^{pH-7.204})$ Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577/(1+10^{7.688-pH}) + 2.487/(1+10^{pH-7.688})) * \min(2.85, 1.45*10^{0.028(25-T)})$	Calculated~~Specified~~??? concentrations to be attained no later than 2020 Acute: 1-hour average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CMC (acute criteria), where $CMC = 0.411/(1+10^{7.204-pH}) + 58.4/(1+10^{pH-7.204})$ Chronic: thirty-day average concentration of total ammonia nitrogen (mg/L) not to exceed, more than once every three years on the average, the CCC (chronic criteria) $CCC = (0.0577/(1+10^{7.688-pH}) + 2.487/(1+10^{pH-7.688})) * \min(2.85, 1.45*10^{0.028(25-T)})$
Chlorophyll *a* concentration (Interim)	Summer average no greater than 40 ug/L; to be attained no later than 2015	Annual average no greater than 40 ug/L; to be attained no later than 2015
Chlorophyll *a* concentration (Final)	Summer average no greater than 25 ug/L; to be attained no later than 2020	Annual average no greater than 25 ug/L; to be attained no later than 2020
Dissolved oxygen concentration (Interim)	Depth average no less than 5 mg/L; to be attained no later than 2015	Minimum of 5 mg/L above thermocline ~~and no less than 2 mg/L in hypolimnion~~; to be attained no later than 2015
Dissolved oxygen concentration (Final)	No less than 5 mg/L 1 meter above lake bottom ~~and no less than 2 mg/L from 1 meter to lake sediment~~; to be attained no later than 2020	Daily average in hypolimnion no less than 5 mg/L; to be attained no later than 2020.

* compliance with targets to be achieved as soon as possible, but no later than the date specified

B. Lake Elsinore and Canyon Lake Nutrient TMDLs, Wasteload Allocations, Load Allocations and Compliance Dates

As discussed in the technical TMDL report, nutrient loading to Canyon Lake and Lake Elsinore varies depending on the hydrologic conditions that occur in the San Jacinto watershed. As part of the TMDL analysis and development, three hydrologic scenarios and the relative frequency of each of these conditions (based upon an 87 year record of flow data at the USGS Gauging station downstream of Canyon Lake), were identified as shown in Table 5-9o. The resulting TMDLs, wasteload allocations and load allocations are based on 10-year running flow weighted average nutrient loads, taking into account the frequency of the three hydrologic conditions and the nutrient loads associated with each of them. Phosphorus and nitrogen TMDLs for Canyon Lake and Lake Elsinore are shown in Table 5-9p. The TMDLs, expressed as 10–year running averages, ~~that~~ will implement the numeric targets, and thereby attain water quality standards, ~~are shown in Table 5-9p~~. Phosphorus and nitrogen w~~W~~asteload allocations for point source discharges and load allocations for nonpoint source discharges, also expressed as 10-year running averages, are shown in Tables 5-9q and 5-9r. No TMDLs, wasteload allocations or load allocations are specified for chlorophyll a, dissolved oxygen or ammonia. Chlorophyll a and dissolved oxygen targets are intended to serve as measures of the effectiveness of phosphorus and nitrogen reductions implemented to meet TMDL requirements. Until ammonia transformations, and nitrogen dynamics in general, are better understood, no ammonia TMDLs, wasteload allocations or load allocations are specified.

Table 5-9o
San Jacinto River Hydrologic Conditions with Relative Flow Frequency at the USGS Gauging Station Downstream of Canyon Lake (Station No. 1170500)

Hydrologic Condition	Representative Water Year	Years of Hydrologic Condition	Relative Frequency (%)	Description
Wet	1998	14	16	Both Canyon Lake and Mystic Lake overflow; flow at the USGS gauging station 11070500 17,000 AF or greater
Moderate	1994	36	41	No Mystic Lake overflow; Canyon Lake overflowed; flow at the USGS gauging station 11070500 less than 17,000 AF and greater than 271 AF
Dry	2000	37	43	No overflows from Mystic Lake or Canyon Lake; flow at the USGS gauging station 11070500 371 AF or less

Table 5-9p
Nutrient TMDLs and Compliance Dates for Lake Elsinore and Canyon Lake

TMDL	Interim Total Phosphorus TMDL (kg/yr)[a, c]	Final Total Phosphorus TMDL (kg/yr)[b, c]	~~Interim Total Nitrogen TMDL (kg/yr)~~[a, c]	Final Total Nitrogen TMDL (kg/yr)[b, c]
Canyon Lake	8,691	6,689	~~45,795~~	37,735 ~~29,672~~
Lake Elsinore	28,584	12,436	~~246,530~~	239,025 ~~231,522~~

[a] Interim compliance to be achieved as soon as possible, but no later than December 31, 2015.
[b] Final compliance to be achieved as soon as possible, but no later than December 31, 2020.
[C] TMDL specified as 10-year running average.

Table 5-9q

Canyon Lake
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Canyon Lake Nutrient TMDL	Interim Total Phosphorus Load Allocation (kg/yr)[b, d]	Final Total Phosphorus Load Allocation (kg/yr)[c, d]	~~Interim Total Nitrogen Load Allocation (kg/yr)~~[b, d]	Final Total Nitrogen Load Allocation (kg/yr)[c, d]
TMDL	**8,691**	**6,689**	~~**45,795**~~	**37,735** ~~**29,672**~~
WLA	**722**	**346**	~~**8,764**~~	**6,482** ~~**4,199**~~
Supplemental water	0	0	~~248~~	248
Urban	504	242	~~5,754~~	4,212 ~~2,670~~
CAFO	218	105	~~2,763~~	2,023 ~~1,282~~
LA	**7,969**	**6,343**	~~**37,031**~~	**31,253** ~~**25,473**~~
Internal Sediment	4,625	4,625	~~13,549~~	13,549
Atmospheric Deposition	221	221	~~1,918~~	1,918
Agriculture	1,948	934	~~10,980~~	8,035 ~~5,095~~
Open/Forest	946	453	~~3,561~~	2,607 ~~1,652~~
Septic systems	228	109	~~7,022~~	5,140 ~~3,258~~

[a] The TMDL allocations for Canyon Lake apply to those land uses located upstream of Canyon Lake.
[b] Interim allocation compliance to be achieved as soon as possible, but no later than December 31, 2015.
[c] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.
[d] TMDL and allocations specified as 10-year running average.

Table 5-9r

Lake Elsinore
Nitrogen and Phosphorus Wasteload and Load Allocations[a]

Lake Elsinore Nutrient TMDL	Interim Total Phosphorus Load Allocation (kg/yr)[b, d]	Final Total Phosphorus Load Allocation (kg/yr)[c, d]	~~Interim Total Nitrogen Load Allocation (kg/yr)[b, d]~~	Final Total Nitrogen Load Allocation (kg/yr)[c, d]
TMDL	**28,584**	**12,436**	**~~246,530~~**	239,025 ~~231,522~~
WLA	**3,845**	**816**	~~7,982~~	7,847 ~~7,712~~
Supplemental water	3,721	744	~~7,442~~	7,442
Urban	124	72	~~540~~	405 ~~270~~
CAFO	0	0	~~0~~	0
LA	**21,969**	**10,235**	**~~210,849~~**	210,404 ~~209,960~~
Internal Sediment	21,554	9,948	~~197,370~~	197,370
Atmospheric Deposition	108	108	~~11,702~~	11,702
Agriculture	60	35	~~330~~	248 ~~165~~
Open/Forest	178	104	~~505~~	379 ~~252~~
Septic systems	69	40	~~942~~	706 ~~471~~
CL Watershed[e]	2,770	1,385	~~27,699~~	20,774 ~~13,850~~

[a] The Lake Elsinore TMDL allocations for urban, agriculture open/forest, septic systems and CAFOs only apply to those land uses located downstream of Canyon Lake.
[b] Interim allocation compliance to be achieved as soon as possible, but no later than December 31, 2015.
[c] Final allocation compliance to be achieved as soon as possible, but no later than December 31, 2020.
[d] TMDL and allocations specified as 10-year running average.
[e] Allocation for Canyon Lake overflows

The TMDL distributes the portions of the waterbody's assimilative capacity to various pollution sources so that the waterbody achieves its water quality standards. The Regional Board supports the trading of pollutant allocations among sources, where appropriate. Trading can take place between point/point, point/nonpoint, and nonpoint/nonpoint pollutant sources. Optimizing alternative point and nonpoint control strategies through allocation tradeoffs may be a cost-effective way to achieve pollution reduction benefits. (See Section E. TMDL Implementation, Task 11, below).

C. Margin of Safety

The Canyon Lake and Lake Elsinore Nutrient TMDLs include an implicit margin of safety (MOS) as follows:

- the derivation of numeric targets based on the 25th percentile of data for both lakes;
- the use of multiple numeric targets to measure attainment of beneficial uses and thereby assure TMDL efficacy;
- the use of conservative literature values in the absence of site-specific data for source loading rates in the watershed nutrient model;
- the use of conservative assumptions in modeling the response of Lake Elsinore and Canyon Lake to nutrient loads; and
- requiring load reductions to be accomplished during hydrological conditions when model results indicate, in some instances, that theoretical loads could be higher.

D. Seasonal Variations/Critical Conditions

The Canyon Lake and Lake Elsinore Nutrient TMDLs account for seasonal and annual variations in external and internal nutrient loading and associated impacts on beneficial uses~~,~~ by the use of a 10-year running average allocation approach. This 10-year running average approach addresses variation in hydrologic conditions (wet, moderate and dry) that can dramatically affect both nutrient loading and lake response.

Compliance with numeric targets will ensure water quality improvements that prevent excessive algae blooms and fish kills, particularly during the critical summer period when these problems are most likely to occur.

E. TMDL Implementation

Typically, under dry and moderate conditions, the internal nutrient loading drives the nutrient dynamics in both Canyon Lake and Lake Elsinore. However, it is the extreme (albeit infrequent) loading that occurs during wet conditions that provides the nutrients to the lakes that remain in the lakes as internal nutrient sources in subsequent years. Given the complexity of the San Jacinto River watershed hydrology, control of nutrients input to the lakes is needed for all hydrologic conditions. Collection of additional monitoring data is critical to developing long-term solutions for nutrient control. With that in mind, the submittal of plans and schedules to implement the TMDLs should take into consideration the need to develop and implement effective short-term solutions, as well as allow for the development of long-term solutions once additional data have been generated.

Implementation of tasks and schedules as specified in Table 5-9s~~,~~ is expected to achieve compliance with water quality standards. Each of these tasks is described below.

Table 5-9s

Lake Elsinore and Canyon Lake Nutrient TMDL Implementation Plan/Schedule Report Due Dates

Task	Description	Compliance Date-As soon As Possible but No Later Than
TMDL Phase 1		
Task 1	Establish New Waste Discharge Requirements	*(*6 months after BPA approval*)*
Task 2	Revise Existing Waste Discharge Permits	*(*6 months after BPA approval*)*
Task 3	Watershed-wide Nutrient Water Quality Monitoring Program 3.1 Watershed-wide Nutrient Monitoring Plan(s) 3.2 Lake Elsinore Nutrient Monitoring Plan(s) 3.3 Canyon Lake Nutrient Monitoring Plan(s)	Plan/schedule due *(*3 months after BPA approval*)* Annual reports due August 15
Task 4	Agricultural Discharges – Nutrient Management Plan	Plan/schedule due *(*2 years after BPA approval*)*
Task 5	On-site Disposal Systems (Septic Systems) Management Plan	~~Plan/schedule due *(*6 months after BPA approval*)*~~Dependent on State Board approval of relevant regulations (see text).
Task 6	Urban Discharges 6.1 Revision of Drainage Area Management Plan (DAMP) 6.2 Revision of the Water Quality Management Plan (WQMP) 6.3 Update of the Caltrans Stormwater Management Plan and Regional Plan 6.4 Update of US Air Force, March Air Reserve Base SWPPP	Plan/schedule due: ~~*(*6 months after BPA approval*)*~~ 6.1 August 1, 2006 6.2 August 1, 2006 6.3 April 1, 2006 6.4 Dependent on Task 3 results. See text.
Task 7	Forest Area – Review/Revision of Forest Service Management Plans	Plan/schedule due *(*2 years after BPA approval*)*
Task 8	Lake Elsinore Lake In-Lake Sediment Nutrient Reduction Plan	Plan/schedule due *(*6 months after BPA approval)**
Task 9	Canyon Lake In-Lake Sediment Treatment Evaluation	Plan/schedule due *(*6 months after BPA approval*)*
Task 10	Watershed and Canyon Lake and Lake Elsinore In-Lake Model Updates	Plan/schedule due *(*6 months after BPA approval*)*
Task 11	Pollutant Trading Plan	Plan/schedule due *(*2 years after BPA approval*)*
Task 1~~1~~2	Review and Revise Nutrient Water Quality Objectives	December 31, 2009
Task 1~~2~~3	Review of TMDL/WLA/LA	Once every 3 years to coincide with the Regional Board's triennial review

[Note: BPA => Basin Plan Amendment]

Task 1: Establish New Waste Discharge Requirements

On or before (**6 months from the effective date of this BPA*), the Regional Board shall issue new waste discharge requirements (NPDES permit) to Elsinore Valley Municipal Water District for supplemental water discharges to Canyon Lake that incorporate the appropriate interim and final wasteload allocations, compliance schedule and monitoring program requirements.

Other proposed nutrient discharges will be addressed and permitted as appropriate.

Task 2: Review and/or Revise Existing Waste Discharge Requirements

There are five Waste Discharge Requirements (WDRs) issued by the Regional Board regulating discharge of various types of wastes in the San Jacinto watershed. On or before (**6 months from the effective date of this Basin Plan amendment**), each of these WDRs shall be reviewed and revised as necessary to implement the Lake Elsinore and Canyon Lake Nutrient TMDLs, including the appropriate nitrogen and phosphorus interim and final wasteload allocations, compliance schedules and/or monitoring program requirements.

2.1 Waste Discharge Requirements for the Riverside County Flood Control and Water Conservation District, the County of Riverside and the Incorporated Cities of Riverside County within the Santa Ana Region, Areawide Urban Runoff, NPDES No. CAS 618033 (Regional Board Order No. R8-2002-0011). The current Order has provisions to address TMDL issues (see Task 6.1, below). In light of these provisions, revision of the Order may not be necessary to address TMDL requirements.

2.2 Watershed-Wide Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with New Developments in the San Jacinto Watershed, Order No. 01-34, NPDES No. CAG 618005. It is expected that this Order will be rescinded once the Regional Board/Executive Officer approves a Water Quality Management WQMP) under Order No. R8-2002-0011 (see 2.1, above and Task 6.2, below)

2.3 General Waste Discharge Requirements for Concentrated Animal Feeding Operations (Dairies and Related Facilities) within the Santa Ana Region, NPDES No. CAG018001 (Regional Board Order No. 99-11).

2.4 Waste Discharge and Producer/User Reclamation Requirements for the Elsinore Valley Municipal Water District, Regional Water Reclamation Facility Riverside County, Order No. 00-1, NPDES No. CA8000027. Revised permit specifications will take into consideration the Lake Elsinore Recycled Water Pilot Project findings.

2.5 Waste Discharge Requirements for Eastern Municipal Water District, Regional Water Reclamation System, Riverside County, Order No. 99-5, NPDES No. CA8000188. Revised permit specifications will take into consideration the Lake Elsinore Recycled Water Pilot Project findings.

2.6 Waste Discharge Requirements for US Air Force, March Air Reserve Base, Storm Water Runoff, Riverside County, Order No. 99-6, NPDES CA 00111007

Task 3: Monitoring

3.1 Watershed-wide Nutrient Water Quality Monitoring Program

No later than (**3 months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, ~~the State of~~ California~~,~~ Department of Transportation (Caltrans), ~~the State of~~ California~~,~~ Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed watershed-wide nutrient monitoring program that will provide data necessary to review and update the Lake Elsinore and Canyon Lake Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: (1) determination of compliance with interim and/or final nitrogen and phosphorus allocations; and (2) determination of compliance with the nitrogen and phosphorus TMDL, including the WLAs and LAs.

At a minimum, ~~the proposed plan shall include the collection of samples at~~ the stations specified in Table 5-9t and shown in Figure 5-3, at the frequency specified in Table 5-9~~s~~t, shall be considered for inclusion in the proposed monitoring plan. If one or more of these monitoring stations are not included, rationale shall be provided and proposed alternative monitoring locations shall be identified in the proposed monitoring plan. In addition to water quality samples, at a minimum, daily discharge (stream flow) determinations shall be made at all stations shown in Table 5-9t.

At a minimum, samples shall be analyzed for the following constituents:

- organic nitrogen
- nitrite nitrogen
- total phosphorus
- total hardness
- total suspended solids (TSS)
- biological oxygen demand (BOD)
- ammonia nitrogen
- nitrate nitrogen
- ortho-phosphate (SRP)
- total dissolved solids (TDS)
- turbidity
- chemical oxygen demand (COD)
- pH
- water temperature

The proposed monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the WLAs/LAs shall be submitted by August 15 of each year.

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. Any such individual or group monitoring plan is due no later than (*3 *months from effective date of this Basin Plan amendment**) and shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the WLAs/LAs.

It may be that implementation of these monitoring requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

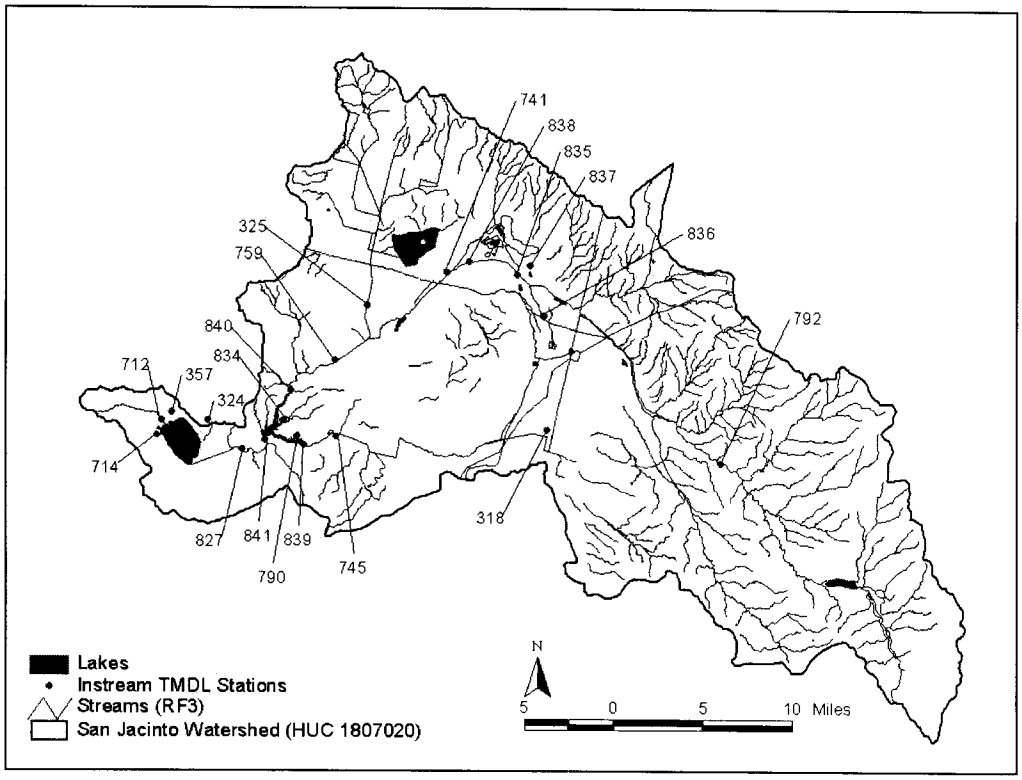

Figure 5-3 – San Jacinto River Watershed Nutrient TMDL Water Quality Stations Locations

Table 5-9t
Lake Elsinore and Canyon Lake Watershed
Minimum Required Sampling Station Locations

Station Number	Station Description
792	San Jacinto River @ Cranston Guard Station
318	Hemet Channel at Sanderson Ave.
745	Salt Creek @ Murrieta Road
759	San Jacinto River @ Goetz Rd
325	Perris Valley Storm Drain @ Nuevo Rd.
741	San Jacinto River @ Ramona Expressway
827	San Jacinto River upstream of Lake Elsinore
790	Fair Weather Dr. Storm Drain in Canyon Lake
357	4 Corners Storm Drain in Elsinore
714	Ortega Flood Channel in Elsinore
324	Lake Elsinore Outlet Channel
712	Leach Canyon Channel in Elsinore
834	Sierra Park Drain in Canyon Lake
835	Bridge Street and San Jacinto River
836	North Side of Ramona Expressway near Warren Road
837	Mystic Lake inflows
838	Mystic Lake outflows
841	Canyon Lake spillway

Frequency of sampling at all stations: dry season – none; wet season; minimum of 3 storms/year whenever possible and 8 samples across each storm hydrograph

3.2 Lake Elsinore: In-Lake Nutrient Monitoring Program

No later than (**3 months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, ~~the State of~~ California, Department of Transportation (Caltrans), ~~the State of~~ California, Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed Lake Elsinore nutrient monitoring program that will provide data necessary to review and update the Lake Elsinore Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: determination of compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. In addition, the monitoring program shall evaluate and determine the relationship between ammonia toxicity and the total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Lake Elsinore.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 5-9u and shown in Figure 5-4, at the specified frequency indicated in Table 5-9u. With the exception of dissolved oxygen and water temperature, all samples to be analyzed shall be depth integrated.

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL shall be submitted by August 15 of each year.

Table 5-9u
Lake Elsinore Minimum Required Sampling Station Locations

Station Number	Station Description
LE 14	Lake Elsinore – inlet
LE 15	Lake Elsinore – four corners
LE 16	Lake Elsinore – mid-lake

Frequency of sampling at all stations: monthly October through May; bi-weekly June through September.

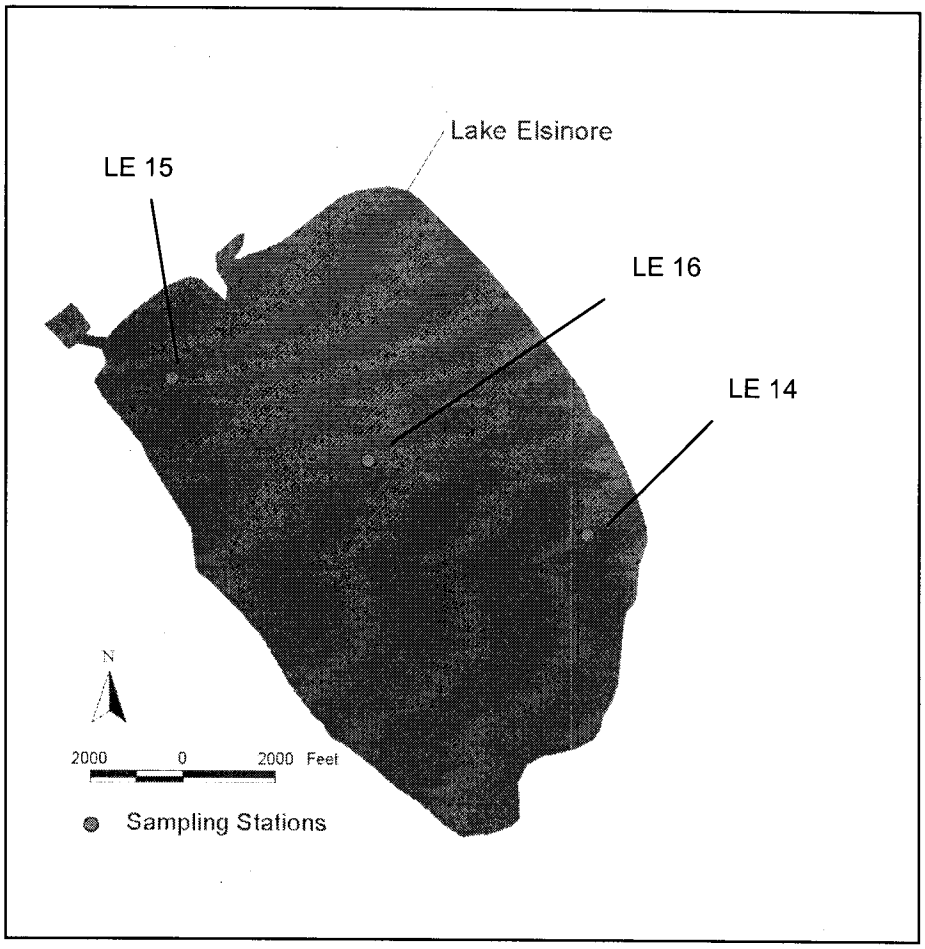

Figure 5-4 Lake Elsinore TMDL monitoring Stations

At a minimum, in-lake samples must be analyzed for the following constituents:

- specific conductance
- water temperature
- pH
- chlorophyll *a*
- organic nitrogen
- nitrite nitrogen
- organic phosphorus
- total hardness
- total dissolved solids (TDS)
- chemical oxygen demand (COD)
- dissolved oxygen
- water clarity (secchi depth)
- ammonia nitrogen
- nitrate nitrogen
- turbidity
- ortho-phosphate (SRP)
- total suspended solids (TSS)
- biological oxygen demand (BOD)

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. Any such individual or group monitoring plan is due no later than (*3 *months from effective date of this Basin Plan amendment* *) and shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s), shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the numeric targets.

It may be that implementation of these requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

3.3 Canyon Lake Nutrient Monitoring Program

No later than (*3 *months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, ~~the State of~~ California~~,~~ Department of Transportation (Caltrans), ~~the State of~~ California~~,~~ Department of Fish and Game, the County of Riverside, the cities of Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed Canyon Lake nutrient monitoring program that will provide data necessary to review and update the Canyon Lake Nutrient TMDL. Data to be collected and analyzed shall address, at a minimum: determination of compliance with interim and final nitrogen, phosphorus, chlorophyll *a*, and dissolved oxygen numeric targets. In addition, the monitoring program shall evaluate and determine the relationship between ammonia toxicity and the total nitrogen allocation to ensure that the total nitrogen allocation will prevent ammonia toxicity in Canyon Lake.

At a minimum, the proposed plan shall include the collection of samples at the stations specified in Table 5-9v and shown in Figure 5-5, at the specified frequency indicated in Table 5-9v. Discrete samples in Canyon Lake are to be collected in the epilimnion, hypolimnion and thermocline when and where appropriate.

The monitoring plan shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report summarizing the data collected for the year and evaluating compliance with the TMDL shall be submitted by August 15 of each year.

Table 5-9v

Canyon Lake Minimum Required Sampling Station Locations

Station Number	Station Description
CL 07	Canyon Lake – At the Dam
CL 08	Canyon Lake – North Channel
CL 09	Canyon Lake – Canyon Bay
CL 10	Canyon Lake – East Bay

Frequency of sampling at all stations: monthly October through May; bi-weekly June through September.

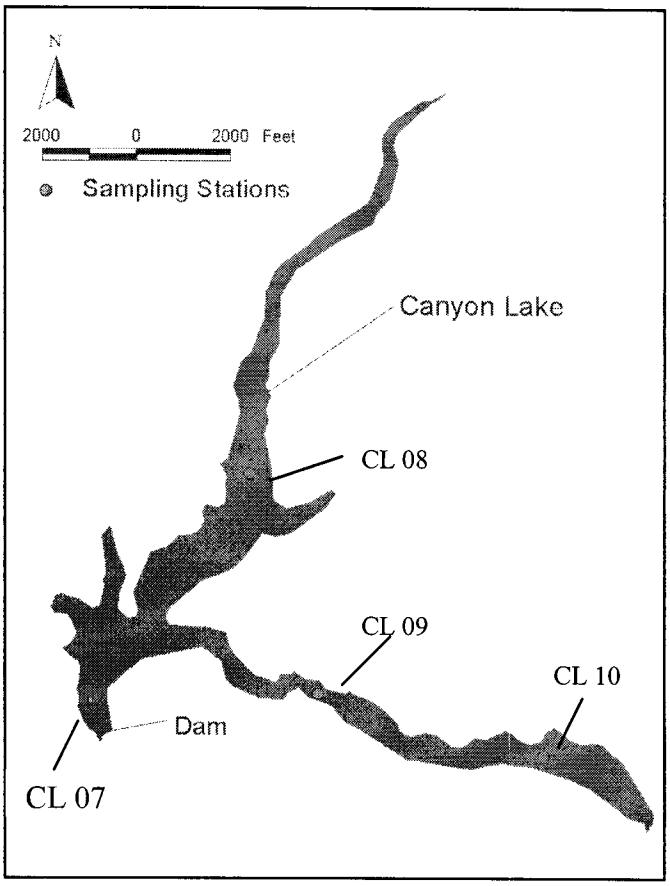

Figure 5-5 – Canyon Lake Nutrient TMDL Monitoring Station Locations

At a minimum, in-lake samples must be analyzed for the following constituents:

- specific conductance
- water temperature
- pH
- chlorophyll *a*
- organic nitrogen
- nitrite nitrogen
- organic phosphorus
- total hardness
- total dissolved solids (TDS)
- chemical oxygen demand (COD)
- dissolved oxygen
- water clarity (secchi depth)
- ammonia nitrogen
- nitrate nitrogen
- turbidity
- ortho-phosphate (SRP)
- total suspended solids (TSS)
- biological oxygen demand (BOD)

In lieu of this coordinated monitoring plan, one or more of the parties identified above may submit a proposed individual or group monitoring plan for Regional Board approval. Any such individual or group monitoring plan is due no later than (*3 *months from effective date of this Basin Plan amendment**) and shall be implemented upon Regional Board approval at a duly noticed public meeting. An annual report of data collected pursuant to approved individual/group plan(s) shall be submitted by August 15 of each year. The report shall summarize the data and evaluate compliance with the numeric targets.

It may be that implementation of these requirements will be required through the issuance of Water Code Section 13267 letters to the affected parties. The monitoring plan(s) will be considered by the Regional Board and implemented upon the Regional Board's approval.

Task 4: Agricultural Activities

No later than (*2 *years from effective date of this Basin Plan amendment* *), the Riverside County Farm Bureau, the UC Cooperative Extension, Western Riverside County Ag Coalition and agricultural operators within the Lake Elsinore and Canyon Lake watershed shall, as a group, submit a proposed Nutrient Management Plan (NMP). The Nutrient Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of a coordinated plan, one or more of the parties identified above may submit a proposed individual or group Nutrient Management Plan to conduct the above studies for areas within their jurisdiction. Any such individual or group plan shall also be submitted for Regional Board approval no later than (*2 *years from effective date of this Basin Plan amendment* *). This Nutrient Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

At a minimum, the NMP shall include, plans and schedules for the following:

- implementation of nutrient controls, BMPs and reduction strategies designed to meet load allocations;
- evaluation of effectiveness of BMPs;
- development and implementation of compliance monitoring; and
- development and implementation of focused studies that will provide the following data and information
  - inventory of crops grown in the watershed;
  - amount of manure and/or fertilizer applied to each crop with corresponding nitrogen and phosphorus amounts; and
  - amount of nutrients discharged from croplands.

The Regional Board expects that the NMP will be submitted and implemented on a voluntary basis. Where and when necessary to implement these requirements, the Regional Board will issue appropriate waste discharge requirements.

Compliance with the agricultural load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 5: On-site Disposal Systems (Septic System) Management Plan

No later than ~~(*6 months from effective date of this Basin Plan amendment *)~~ 6 months of the effective date of an agreement between~~,~~ the County of Riverside and the Regional Board to implement regulations

adopted pursuant to Water Code Sections 13290-13291.7, or if no such agreement is required or completed, within 12 months of the effective date of these regulations, the County of Riverside and the Cities of Perris, Moreno Valley and Murrieta shall, as a group, submit a Septic System Management Plan to identify and address nutrient discharges from septic systems within the San Jacinto watershed. The Septic System Management Plan shall implement regulations adopted by the State Water Resources Control Board pursuant to California Water Code Section 13290 – 13291.7.

At a minimum, the Septic System Management Plan shall include plans and schedules for the development and implementation of the following:

- public education program;
- tracking system, including maintenance thereof;
- maintenance standards;
- enforcement provisions;
- monitoring program; and
- sanitary survey.

In lieu of a coordinated plan, one or more of the agencies with septic system oversight responsibilities may submit an individual or group Management Plan to develop the above Plan for areas within their jurisdiction. Any such individual or group plan shall also be submitted no later than (**6 months from effective date of this Basin Plan amendment* *). This Septic System Management Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the septic systems load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 6: Urban Discharges

Urban discharges including stormwater runoff, includes those from the cities and unincorporated communities in the San Jacinto River watershed. These discharges are regulated under the Riverside County MS4 NPDES permit. Nuisance and stormwater runoff from state highways and right of ways is regulated under the State of California, Department of Transportation (Caltrans) statewide general NPDES permit. Finally, nuisance and stormwater runoff from the March Air Reserve Base is also regulated through an NPDES permit.

6.1 Revision to the Drainage Area Management Plan (DAMP)

Provision XIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to revise their Drainage Area Management Plan (DAMP) to include TMDL requirements. ~~Each year, by~~ By August 1, 2006, the permittees shall ~~are required to~~ review and revise the~~ir~~ DAMP as necessary to address the requirements of these nutrient TMDLs. Further review and revision of the DAMP needed to address these TMDLs shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing. The DAMP ~~se~~ revisions shall include schedules for meeting the interim and final nutrient wasteload allocations. The co-permittees shall also provide a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocation for urban runoff. The proposal must be implemented upon Regional Board approval at a duly noticed public meeting.

6.2 Revision of the Water Quality Management Plan (WQMP)

Provision VIII.B. of Order No. R8-2002-0011 (see 2.1, above) requires the permittees to develop and submit a WQMP by June 2004 for the Executive Officer's approval. By August 1, 2006, the permittees shall submit a revised ~~The~~ WQMP that ~~shall~~ addresses the nutrient input from new developments and significant redevelopments to assure compliance with the nutrient wasteload allocations for urban runoff. The WQMP shall also address requirements currently in Order No. 01-34 (see 2.2, above). Once the WQMP is approved, Order No. 01-34 will be rescinded. Further review and revision of the WQMP necessary to assure that TMDL requirements are addressed shall be completed in accordance with the requirements of Order No. R8-2002-0011 or amendments/updates thereto that are adopted by the Regional Board at a public hearing.

6.3 Revision of the State of California, Department of Transportation (Caltrans) Stormwater Permit

Provision E.1 of Order No. 99-06-DWQ requires Caltrans to maintain and implement a Storm Water Management Plan (SWMP). Annual updates of the SWMP needed to maintain an effective program~~,~~ are required to be submitted to the State Water Resources Control Board.

Provision E.2 of Order No. 99-06-DWQ requires Caltrans to submit a Regional Workplan by April 1 of each year for the Executive Officer's approval. By April 1, 2006, Caltrans shall submit a ~~The~~ Regional Workplan that ~~shall~~ includes plans and schedules for meeting the interim and final nutrient wasteload allocations, and provides a proposal for 1) evaluating the effectiveness of BMPs and other control actions implemented and 2) evaluating compliance with the nutrient waste load allocations for urban runoff , which includes runoff from Caltrans facilities. The proposal shall be implemented upon the Executive Officer's approval. Annual updates to the Regional Workplan shall include, as necessary, revised plans and schedules for meeting the interim and final nutrient wasteload allocations and revised proposals for evaluating the efficacy of control actions and compliance with the nutrient wasteload allocations.

6.4 Revision to the United States Air Force, March Air Reserve Base, Stormwater Permit

Order No. 99-6 specifies monitoring and report requirements for stormwater runoff from the US Air Force, March Air Reserve facility. Provision B.11.a and B.11.b requires that March Air Reserve Base submit a report and revise the Stormwater Pollution Prevention Plan (SWPPP) to address any pollutants that may be causing or contributing to exceedances of water quality standards. Results from the TMDL nutrient monitoring program conducted pursuant to Task 3, shall serve as the basis for revision of the SWPPP.

Development of the Municipal permittee's WQMP and revisions to their DAMP, development of the Caltrans SWMP~~WQMP~~ and Regional Workplan, and Revision to the March Air Reserve Base SWPPP, shall address the urban component of the nutrient TMDL.

Compliance with the urban wasteload allocation may be achieved through a Regional Board approved pollutant trading program.

Task 7: Forest Area – Revision of Forest Service Management Plans

No later than (**2 years from effective date of this Basin Plan amendment* *), the US Forest Service shall submit for approval a plan and schedule for review and revision of the Cleveland National Forest Service ~~7~~Management Plan and the San Bernardino National Forest Service Management Plan to identify watershed-specific appropriate Best Management Practices (BMPs) that will be implemented to achieve

the interim and final load allocations for forest/open space. The proposal shall include specific recommendations for 1) evaluating the effectiveness of control actions implemented to reduce nutrient discharges from forest/open space and 2) evaluating compliance with the nutrient load allocation from forest/open space. The revised watershed-specific BMPs shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the open space/forest load allocation may be achieved through a Regional Board approved pollutant trading program.

Task 8: Lake Elsinore Sediment Nutrient Reduction Plan

No later than (**6 months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, the State of California, Department of Transportation (Caltrans), the State of California, Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Eastern Municipal Water District, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for in-lake sediment nutrient reduction for Lake Elsinore. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to prevent the release of nutrients from lake sediments to support development of a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that are implemented. The Lake Elsinore In-lake Sediment Nutrient Reduction Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated ~~monitoring~~ plan, one or more of the parties identified above may submit a proposed individual or group In-lake Sediment Nutrient Reduction Plan for approval by the Regional Board. Any such individual or group Plan is due no later than (**6 months from effective date of this Basin Plan amendment*)* and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Compliance with the Lake Elsinore Sediment Nutrient Reduction Plan requirement may be achieved through a Regional Board approved pollutant trading program.

Task 9: Canyon Lake Sediment Nutrient Treatment Evaluation Plan

No later than (**6 months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, ~~the State of~~ California~~,~~ Department of Transportation (Caltrans), ~~the State of~~ California~~,~~ Department of Fish and Game, the County of Riverside, the cities of Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Murrieta, Riverside and Beaumont, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators within the San Jacinto watershed shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for evaluating in-lake sediment nutrient treatment strategies for Canyon Lake. The proposed plan shall include an evaluation of the applicability of various in-lake treatment technologies to prevent the release of nutrients from lake sediments in order to develop a long-term strategy for control of nutrients from the sediment. The submittal shall also contain a proposed sediment nutrient monitoring program to evaluate the effectiveness of any strategies that are implemented. The Canyon Lake In-lake Sediment Nutrient Treatment Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated ~~monitoring~~ plan, one or more of the parties identified above may submit a proposed individual or group In-lake Sediment Nutrient Treatment Evaluation Plan for approval by the Regional Board. Any such individual or group Plan is due no later than (*6 *months from effective date of this Basin Plan amendment**) and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 10: Update of Watershed and In-Lake Nutrient Models

No later than (**6 months from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, ~~the State of~~ California~~,~~ Department of Transportation (Caltrans), ~~the State of~~ California~~,~~ Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Riverside and Beaumont, Eastern Municipal Water District, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators shall, as a group, submit to the Regional Board for approval a proposed plan and schedule for updating the existing Lake Elsinore/San Jacinto River Nutrient Watershed Model and the Canyon Lake and Lake Elsinore in-lake models. The plan and schedule must take into consideration additional data and information that are generated from the respective TMDL monitoring programs. The plan for updating the Watershed and In-lake Models shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group plan for update of the Lake Elsinore/San Jacinto River Nutrient Watershed Model and the Canyon Lake and Lake Elsinore in-lake models. The plan and schedule must take into consideration additional data and information that are generated from the respective TMDL monitoring programs. Any such individual or group Plan is due no later than (*6 *months from effective date of this Basin Plan amendment**) and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 11: Pollutant Trading Plan

No later than (*2 years *from effective date of this Basin Plan amendment* *), the US Forest Service, the US Air Force (March Air Reserve Base), March Joint Powers Authority, California Department of Transportation (Caltrans), California Department of Fish and Game, the County of Riverside, the cities of Lake Elsinore, Canyon Lake, Hemet, San Jacinto, Perris, Moreno Valley, Riverside and Beaumont, Eastern Municipal Water District, Elsinore Valley Municipal Water District, concentrated animal feeding operators and other agricultural operators shall, as a group, submit to the Regional Board for approval a proposed Pollutant Trading Plan. At a minimum, this plan shall contain a plan, schedule and funding strategy for project implementation, an approach for tracking pollutant credits and a schedule for reporting status of implementation of the Pollutant Trading Plan to the Regional Board. -The Pollutant Trading Plan shall be implemented upon Regional Board approval at a duly noticed public meeting.

In lieu of this coordinated plan, one or more of the parties identified above may submit a proposed individual or group Pollutant Trading Plan. Any such individual or group Plan is due no later than (*2 years *from effective date of this Basin Plan amendment**) and shall be implemented upon Regional Board approval at a duly noticed public meeting.

Task 1~~1~~2: Review and Revision of Water Quality Objectives

By December 31, 2009, the Regional Board shall review and revise as necessary the total inorganic nitrogen numeric water quality objectives for Lake Elsinore and Canyon Lake. In addition, the Regional Board shall evaluate the appropriateness of establishing total phosphorus and ~~site-specific~~ un-ionized

ammonia numeric water quality objectives for both Lake Elsinore and Canyon Lake. Given budgetary constraints, completion of this task is likely to require substantive contributions from interested parties.

Task 1~~2~~3: Review/Revision of the Lake Elsinore/Canyon Lake Nutrient TMDL

The basis for the TMDLs and implementation schedule will be re-evaluated at least once every three years[1] to determine the need for modifying the load allocations, numeric targets and TMDLs. Regional Board staff will continue to review all data and information generated pursuant to the TMDL requirements on an ongoing basis. Based on results generated through the monitoring programs, special studies, ~~and/or~~ modeling analysis, and/or ~~responsible party's~~ special studies by one or more responsible parties, changes to the TMDL, including revisions to the numeric targets, may be warranted. Such changes would be considered through the Basin Plan Amendment process.

The Regional Board is committed to the review of this TMDL every three years, or more frequently if warranted by these or other studies

References

1. California Regional Water Quality Control Board, Lake Elsinore Nutrient TMDL Problem Statement, October, 2000.

2. California Regional Water Quality Control Board, Canyon Lake Nutrient TMDL Problem Statement, October 2001.

3. California Regional Water Quality Control Board, Total Maximum Daily Load for Nutrients in Lake Elsinore And Canyon Lake, May 2004

4. Environmental Protection Agency, Update of Ambient Water Quality Criteria for Ammonia. EPA-822-R-99-014, 1999.

[1] The three-year schedule will coincide with the Regional Board's triennial review schedule.

Index of Comments/Responses

WARREN D. WILLIAMS
Riverside County Flood Control and Water Conservation District
(letter dated June 3, 2004)

Comment 1
Because of insufficient data, several conservative assumptions were made in developing the TMDLs, leading to recommendations for unnecessarily stringent numeric targets.

Staff Response
The best available data were used to develop the recommended TMDLs, including the numeric targets. Because of the uncertainty resulting from insufficient data, conservative assumptions were used in the development of the TMDLs and constitute an implicit Margin of Safety (MOS). A MOS is a requisite component of the TMDL. Data deficiencies are recognized in the TMDL report and are reflected in the schedules recommended for compliance with both the interim and final numeric targets. As additional data are collected, including consideration of the effects of ongoing and proposed projects to address the eutrophication problems, a more robust uncertainty analysis can be conducted and the MOS and TMDLs can be adjusted as appropriate. This includes review and refinement of the numeric targets and the load and wasteload allocations established to meet the targets. The proposed compliance schedules allow ample time for these analyses.

The proposed numeric targets for the Lake Elsinore and Canyon Lake nutrient TMDLs were selected based on best professional judgment of the levels necessary to implement existing water quality standards, that is, to protect beneficial uses and meet both narrative and numeric water quality objectives established in the Basin Plan. This approach is consistent with US EPA guidance that numeric targets should be based on the existing water quality standards. It is also consistent with the inherent purpose and mandate of the TMDLs, which is to achieve those standards. For Inland Surface Waters (including both Lake Elsinore and Canyon Lake), the Basin Plan (1995) specifies that " Waste discharges shall not contribute to excessive algal growth in receiving waters." In deriving the proposed numeric targets for Lake Elsinore, staff selected a time period when Lake Elsinore did not experience severe algal blooms or fish kills as a reference state for the Lake. It is not certain, however, that all affected beneficial uses (Warmwater aquatic habitat, Wildlife, Body-contact and non-body contact recreation) were protected by the nutrient levels measured during this reference period. Therefore staff took a conservative approach by selecting the lower 25th percentile of the phosphorus concentrations measured during this period. Again, this and other assumptions used in the formulation of the proposed TMDLs are subject to future review and revision, if it is warranted.

Comment 2
The proposed interim and final TMDL targets for total phosphorus and total nitrogen are not realistic. Compliance with these targets is technically and fiscally infeasible. The targets are lower than [more stringent than] the minimum irreducible concentrations that can be achieved based on current common treatment control technologies for stormwater. The interim and final targets for the wastewater treatment plants are significantly higher than the lake numeric targets and are more in line with the irreducible concentrations. It is unreasonable to suppose that stormwater could meet the proposed targets when advanced wastewater treatment plants cannot do so. The wastewater and stormwater

BMP technologies best capable of achieving the proposed TMDL numeric targets are expensive to implement and are only fiscally feasible for treating small volumes of runoff. These technologies are neither physically nor fiscally feasible for treatment of large volumes of stormwater.

Staff Response

First, a clarification of terms is appropriate. The proposed interim and final numeric targets in the TMDLs are the goals for the receiving waters, while wasteload and load allocations pertain to nutrient inputs from individual sources, such as stormwater runoff. The purpose of these allocations is to assure that, cumulatively, the numeric targets will be met. The District's analysis focuses on the numeric targets but does not directly address the wasteload allocations for stormwater as they are expressed in the proposed TMDLs, i.e., as kg/yr, based on a 10 year running average, with compliance to be achieved by 2015 (interim) and 2020 (final). Evaluations of cost and technical feasibility should take these averaging and compliance time frames into account.

The District's comments and analysis (e.g., the tables on pages 3 and 4 of the comment letter) regarding fiscal and technical feasibility appear to be predicated on the assumption that the only means of compliance with the "numeric targets" (more accurately, with wasteload allocations needed to implement the numeric targets) is treatment of stormwater to achieve the requisite nutrient input reductions. Staff believes that this is not the case. First, evidence elsewhere (e.g., the Newport Bay watershed) demonstrates that BMPs such as source control can result in substantial pollutant reductions. It is likely that additional, more effective BMPs will need to be developed to achieve ultimate compliance, and the District should not assume otherwise. Experience demonstrates that technological innovation is likely to progress to support TMDL implementation. As stated above, compliance schedules are proposed that will allow future development and refinement of BMPs. Second, the proposed TMDL recognizes that pollutant trading mechanisms could be employed whereby the wasteload allocations could be effectively achieved by implementation of measures that result in direct removal of nutrients from the lakes and/or by implementation or enhancement of other projects intended to reduce internal nutrient loading. Other pollutant trading mechanisms may be proposed. Use of a specific pollutant trading mechanism would require Regional Board approval. Requirements for the implementation, review and revision of BMPs needed to address nutrient inputs in urban runoff would continue to be enforced under the terms of the MS4 permit.

In contrast to the District's assertion, staff believes that the proposed interim numeric targets are realistic and achievable. For example, as discussed in the TMDL Report, for Lake Elsinore, the proposed dissolved oxygen target was achieved during certain times in 2000 – 2001, and the total phosphorus and chlorophyll a targets were almost achieved in 2000-2001(see Table 4-2), even in the absence of TMDL-required nutrient control measures.

Staff recognizes that it will likely be challenging to achieve the final proposed numeric targets and wasteload allocations. For this reason, staff has proposed a 15 year timeframe for compliance. This period will allow the evaluation of planned projects designed to address nutrient problems in the lakes and application of the results in development and implementation of additional projects and BMPs. This compliance

period will also allow additional data collection and analysis that may support revisions to the TMDLs.

Comment 3
There is a need for economic analysis of the proposed TMDLs. The cost to achieve the proposed TMDL target receiving water concentrations and the relative value of the expected improvements in attainment of beneficial uses must be fully identified and considered in the issuance of the TMDLs. A recent Superior Court decision requires that the factors specified in Water Code Section 13241, which include economics, must be considered when incorporating a TMDL in the Basin Plan.

Staff Response
First, the Superior Court case to which the District refers (the City of Arcadia *et al* versus. the State Water Resources Control Board and the Los Angeles Regional Board*)* is currently on appeal. It is therefore not binding authority and there is no final judgment.

By its own terms, Section 13241 of the California Water Code applies to establishing water quality objectives. It does not apply to designating uses, or to establishing programs of implementation, which are governed by section 13242. Nor does Section 13241 apply to establishing TMDLs. Federal law mandates that TMDLs be set a level that will ensure attainment of the existing water quality standards (including objectives). The economic feasibility to the dischargers of achieving the standards is therefore neither relevant nor authorized when setting the TMDL. As explained in the TMDL report, the costs of the methods of compliance must be considered by the Regional Board as part of the CEQA process for the proposed Basin Plan amendment. This does not require a cost/benefit analysis. The District, as well as other dischargers, has provided cost information. Staff is not persuaded that the information submitted by the District is an accurate assessment since it does not address directly the wasteload allocations for stormwater, expressed as 10 year running averages, with 10 and 15-year compliance schedules. Nor does the assessment address the potential for implementation of pollutant trading mechanisms in lieu of the assumed treatment of stormwater. As noted above, staff has considered the likely difficulty, including cost, of meeting the TMDLs in recommending 10 and 15-year compliance schedules

At the same, time it must be recognized that there are costs associated with non-compliance with the TMDL. The fish kill in 2002 costs LESJWA $17,000 in clean-up costs. Fish kills and the green algae on the Lake Elsinore surface also severely impact the use of the lake and therefore the revenue to the City of Lake Elsinore. If the TMDL were not implemented, fish kills could conceivably occur yearly and therefore potential costs for non-compliance would be approximately $20,000 or more per year.

With the passage of Proposition 13 in 2000, the State of California has invested $15,000,000 into improving Lake Elsinore, Canyon Lake and the San Jacinto River watershed. Without the implementation of nutrient controls in the watershed, the State's investment in improving water quality and beneficial uses in the lakes would likely be largely wasted. All parties responsible for nutrient inputs to the Lakes, including the District, must take appropriate responsibility for controlling them. This may take the form of source control BMPs, wastewater treatment, internal nutrient loading reduction projects and/or implementation of pollutant trading mechanisms. Innovative approaches and not

sole reliance on currently accepted and available technology will likely be necessary to achieve water quality standards in the lakes.

Comment 4
Revise the TMDL implementation plan to allow for the evaluation of the management measures either implemented or scheduled for implementation during the first five years (2005 – 2010) of the TMDL. In addition, the TMDL should specify that the first five years of the TMDL will be used to collect additional watershed and lake monitoring data, and implement test projects to analyze the effectiveness of potential nutrient control BMPs. The TMDL lake and watershed models should then be recalibrated with data collected during the five-year period.

Staff Response
As previously discussed, the proposed TMDLs include 10 and 15 year compliance schedules that will allow for the evaluation of management measures and collection of additional data. Additional data collection is a requisite part of the proposed TMDL implementation plan (Task 3). These data can be used to support lake and watershed model updates and revision of the TMDLs, if warranted. The proposed implementation plan explicitly requires that the watershed and in-lake nutrient models be updated (Task 10).

As shown in Attachment to the Resolution, staff now recommends that the compliance dates specified for urban dischargers (Task 6) be revised in order to be consistent with existing permit compliance dates.

Comment 5
Recommendation 1. Delete the unattainable final numeric target criteria for total phosphorus and total nitrogen

Staff Response
As previously discussed, TMDLs must be established to assure that water quality standards are achieved. The final numeric targets proposed in the TMDLs were based on best professional judgment of the nutrient levels needed to achieve that goal. As such, they are a requisite part of the TMDLs. Again, an extended schedule for compliance with these targets is also proposed. The final (and interim) targets can be revised based on additional data, update of the watershed and in-lake nutrient models, and evaluation of the efficacy of management measures that are implemented.

Comment 6
Recommendation 2. Review the conservative assumptions used to establish the numeric targets to see if the numeric targets can be set at or above the known nutrient irreducible concentrations and still be protective of Beneficial Use.

Staff Response
As discussed in the TMDL Technical Report, an implicit or explicit margin of safety (MOS) is a requisite component of the TMDLs. Because of uncertainty, conservative assumptions were used in the development of the TMDLs and constitute an implicit MOS. As also discussed in the TMDL Technical Report, as additional data are collected, a more

robust uncertainty analysis can be conducted and the MOS and TMDLs can be adjusted as appropriate. The proposed compliance schedules allow ample time for these analyses.

Further, as discussed in the response to Comment 3, the TMDLs must be established to meet water quality standards. Technical and/or economic feasibility cannot be used to establish the TMDLs. These factors are taken into account in the implementation plan for the TMDL, in particular, the schedules proposed for compliance.

Comment 7
Recommendation 3. Incorporate an economic analysis of the costs and benefits of the proposed TMDL.

Staff Response
Please see the response to Comment 3, above. Board staff welcomes information and analysis of the potential costs of compliance, as well as the costs of failing to implement nutrient control measures. This information will be presented to the Regional Board. It is appropriate to reemphasize here that the economic feasibility to the dischargers of achieving water quality standards is neither relevant nor authorized when setting the TMDLs

Comment 8
Recommendation 4. Revise the implementation schedule to allow time for dischargers to enter into cooperative agreements to fund and operate TMDL compliance programs. The implementation schedule should also be revised to place initial focus on the control of internal nutrient sources, the collection of additional data, assessments of the efficacy of nutrient control programs and the implementation of pilot nutrient control projects.

Staff Response
Staff supports the approach the District has outlined, to implement pilot projects, gather and refine models, etc., and believe that the proposed Basin Plan amendment already gives the flexibility to the dischargers to do these things. [We believe that adding the specificity recommended by the District for what should be accomplished within the 5-year period could potentially backfire if certain requirements are not met within the specified timeframe. It would be much easier to have the Regional Board approve a modification to a monitoring program or DAMP submittal than revising the Basin Plan to modify tasks and/or a due date].

RCFCD Comments in Attachment A of the letter - TMDL NUTRIENT DATA DEFICIENCIES

(If the comments are the same as in the main body of the letter, they are not repeated here)

Comment 9
The limnology of Canyon Lake is significantly more complex than that of Lake Elsinore, and therefore the targets proposed for Lake Elsinore may be too restrictive for Canyon Lake.

Staff Response
Canyon Lake and Lake Elsinore are located in the same watershed and spills from Canyon Lake are the most significant source of water for Lake Elsinore. The numeric targets for Canyon Lake must be stringent enough to ensure the protection of beneficial uses downstream. Therefore, staff used the same indicators and numeric targets for both lakes. The TMDLs, including the numeric targets, for both lakes are subject to review and revision based on additional data collection and analyses. The schedules for compliance allow time for this review to occur.

Comment 10
Two targets are proposed to reduce nutrient loading to Lake Elsinore – an interim 35% internal lake nutrient load reduction by 2015 and a final 70% internal lake nutrient load reduction by 2020. The feasibility of the reduction is uncertain.

Staff Response
The difficulties and uncertainties in developing and implementing the TMDLs are reflected in the compliance schedules proposed. Uncertainty does not obviate the need to establish TMDLs that will achieve compliance with water quality standards.

To expand on the information in the Technical Report for the TMDLs, a limnocosm study funded by LESJWA and conducted by Dr. Anderson at UCR demonstrated that aeration to maintain a dissolved oxygen level of 7 mg/L in the water column will reduce the phosphorus release rate by 39%. During this experiment, Alum treatment completely stopped the phosphorus release (although Alum treatment, at this time, is not feasible for Lake Elsinore due to high pH in the lake, it may become feasible in the future when and if the pH decreases). Dr. Anderson also tested the efficacy of treatment of the sediment with the addition of calcium. Calcium treatment reduced the phosphorous release rate by 67% (Final report submitted to LESJWA by Dr. Anderson, 2000). Other treatment options such as biomanipulation (e.g., fishery management), individually or collectively with other treatment options may reduce the phosphorus release rate by 70%. Therefore, possible alternatives to achieve the 35% and even the 70% reductions in internal phosphorus release have been identified and need to be investigated. The compliance schedules proposed in the TMDLs allow this evaluation and technological innovation to occur. In addition, the targets may be revised as new data and information become available.

Comment 11
The TMDL derivation period experienced below-average precipitation and sufficient flow did not occur to allow calibration of the models for wet year conditions. Thus, the TMDL models are not calibrated for wet conditions.

Staff Response
Staff has acknowledged the fact that wet season data were not available to calibrate the model. Thus, it is imperative that the data collection effort continue. Monitoring and update of the watershed and in-lake nutrient models are components of the proposed implementation plan. Once again, the proposed compliance schedules allow for additional data collection and refinement of both the models and the TMDLs.

RCFCD Comments from Attachment B of the letter - Are TMDL Targets Realistic?

(If the comments are the same as in the main body of the letter, they are not repeated here)

Comment 12
The beneficial uses identified for Lake Elsinore in the Basin Plan could not be attained under natural conditions. These beneficial uses can only be supported through the implementation of extreme and costly measures.

Staff Response
The relevant beneficial uses designated in the Basin Plan for Lake Elsinore (WARM, WILD, REC-1 and REC-2) are existing uses, as defined in federal regulation. Recognizing the value of these uses, both economically and from a recreational and wildlife perspective, substantial sums of money have been or are proposed to be expended to address the lakes' problems. For example, in the 1990s, the levee project cost nearly $50 million to the federal and state government. In 2000, the State gave $15 million for Lake Elsinore restoration. The City of Lake Elsinore and Elsinore Valley MWD have each spent $650,000 per year for supplemental water. The City received a $3 million grant (2004) from the California Department of Boating & Waterways to rehabilitate the Boat Launch Facility at the LERA Campground. The City will expend an additional $1-4 million to complete the project.

Please see also the response to Comment 3.

Comment 13
The irreducible concentrations for TN and TP are almost twice their respective interim targets, indicating that the interim targets, much less the final targets, may be unachievable with current BMP technology.

Staff Response
The term "irreducible concentration" is used in the stormwater literature to represent the lowest effluent concentration for a given parameter that can be achieved by a specific type of stormwater management practice. The "irreducible concentrations" listed in your table were based on the examination of the effluent concentrations achieved by stormwater management practices from published studies for several parameters, including phosphorus and nitrogen. Recent research (ASCE 2000) indicates that achievable effluent concentrations vary appreciably between BMP types (p.33 in Urban Stormwater BMP Performance Monitoring, 2002.) Once again, the numeric targets only apply to the in-lake concentrations, not the effluent concentrations. The WLA for urban is applied to the urban sources entering the lakes.

See also response to Comment 2.

RCFCD Comments in ATTACHMENT C OF THE LETTER - NEED FOR ECONOMIC ANALYSIS

Comment 14
It is imperative that economic considerations be analyzed in adopting the TMDL.

Staff Response
Please see response to Comment 3.

RCFCD Comments *in* ATTACHMENT D OF THE LETTER - IMPLEMENTATION SCHEDULE

Comment 15
Compliance with TMDL targets should be delayed until further study of the applicability of the numeric targets can be completed. This period of study should be sufficient to allow for a wet year to occur. This would likely be no less than 5 years from adoption date.

Staff Response
The proposed TMDLs include 10 and 15 year compliance schedules that will allow for further study of the numeric targets.

Comment 16
It will take time to form the necessary discharger work groups, identify funding sources to prepare plans and participate in such a coordinated effort. Further the FY 2004-05 budget planning cycle has passed. Plan submittal dates should be respective of fiscal cycles. Some cities may also require additional time for the bid process to hire consultants.

Staff Response
Board staff has been working with stakeholders, including the District, on the TMDLs through the TMDL Workgroup since 2000, and this issue has been raised several times by the county, the watershed cities and others. Staff has consistently indicated that one of the likely components of the TMDL would be the requirement to continue the monitoring program, as well as to implement BMPs or other control measures. Staff has emphasized to the stakeholder group the need to get organized so that the costs associated with TMDL implementation can be shared among all the parties. Staff has gone so far as to invite a representative of the Newport Bay Watershed Management Committee to a meeting of the Lake Elsinore TMDL workgroup to describe how Newport Bay stakeholders have organized the various agencies and parties to implement the Newport Bay TMDLs. Since staff has been informing the TMDL workgroup about how these requirements were likely to be specified, the proposed requirements should come as no surprise to the District or watershed cities.

In response to this concern, however, the proposed Basin Plan amendment has been revised to require the revision of the DAMP and WQMP in 2006 (see Attachment to Resolution No. R82004-0037, Task 6).

There are existing stakeholder groups in the San Jacinto River watershed through which the dischargers could organize, e.g., San Jacinto River Watershed Council, and/or the Lake Elsinore and San Jacinto Watersheds Authority (LESJWA). Indeed, recently LESJWA has looked into a proposal that calls for the watershed cities and the county to begin levying a fee on property owners to help pay for the cost of addressing the nutrient problem downstream.

We encourage the county and watershed cities to be proactive and to begin now to organize the appropriate group or begin working with the San Jacinto River Watershed Council and/or LESJWA.

RCFCD Comments in ATTACHMENT E OF THE LETTER - RECOMMENDATIONS

Comment 17
The text on page 75 describing Tables 7-1 through 7-4 should make it clear that there are separate discharger nutrient allocations for Lake Elsinore and Canyon Lake.

Staff Response
We believe that the language on page 69, which states, "...the external loading component of the TMDLs was subdivided into two parts: one for the Canyon Lake (CL) watershed and the other for the Lake Elsinore (LE) watershed", provides the clarification necessary. Tables 7-1 through 7-4, and the language on page 75 speak for themselves. Staff does not believe any other clarifying remarks are needed.

Comment 18
The TMDL should include a framework under which pollutant trading may occur. There are four questions that should be answered in the framework: credit banking, credit tracking, implementation procedure and pollutant trading value of specific activities. Alternatively, the District suggests that the Regional Board could require the dischargers to develop this guidance as part of the Implementation Schedule.

Staff Response
Guidance from the State Board states, "When a TMDL is in place, the Clean Water Act (CWA) and the California law give wide latitude to develop creative means of achieving compliance with water quality standards (WQS), subject to certain limitations." (Memo from the Office of Chief Counsel, October 2001). The Regional Board certainly encourages pollutant trading given the arid climate and extreme variable hydrology. Based on this comment and comments from the City of Lake Elsinore, staff proposes that the Basin Plan amendment be revised to specify that all responsible stakeholders develop, for approval by the Regional Board, a pollutant trading plan. In addition, staff is proposing that the Basin Plan amendment acknowledge that pollutant trading is an option for dischargers in lieu of meeting their allocations (see Attachment to Resolution No. R8-2004-0037).

Comment 19
We request that the total atmospheric deposition be calculated for the entire watershed, removed from the other land uses and include [sic] as a LA in the model.

Staff Response
The nutrients from atmospheric deposition on the watershed enter the lakes via runoff and are accounted for in the load and wasteload allocations. If the atmospheric deposition over the watershed received a LA, it would greatly reduce the share of the TMDL (LA and WLA) given to other sources.

Comment 20
Several important nutrient control projects shall be initiated within the next five years..... As an alternative to the immediate implementation of the interim numeric targets, the first five years of the TMDL could be used to determine the impact of these activities on the beneficial uses in the lakes. Allowing time to examine alternative nutrient control mechanisms, refine and update the models, and propose revised numeric targets will ensure that limited discharger resources are spent on activities that will effectively address the lake impairments.

Staff Response
Please see the responses to Comments 4, 8 and 15. The 10 year average allocations, and 10 and 15 year compliance schedules allow for the analyses recommended by the District.

Staff supports the District's proposal to continue monitoring and to identify and implement pilot projects. The District/cities can include these proposed projects and schedules for the Regional Board's consideration as part of the submittals required in Task 6 of the proposed implementation plan.

Comment 21
The requirements of Task 5 are premature at this time since the State Water Resources Control Board has not adopted the regulations required under AB 885 and it is not a foregone conclusion that local agencies will enter into MOUs. Without MOUs, it is not possible to implement Task 5. Alternative language for this Task is proposed.

Staff Response
Staff agrees that additional time may be needed to allow for the adoption of the regulations and the development of necessary MOUs and other agreements. Staff recommends that the Basin Plan amendment be revised to specify that within 6 months of the effective date of an agreement between the Riverside County and the Regional Board to implement regulations adopted by the State Water Resources Control Board pursuant to Water Code Sections 13290-13291.7, or, if no such agreement is required or completed, within 12 months of the effective date of these regulations, the County of Riverside and the Cities of Perris... ...The Septic System Management Plan shall implement regulations adopted by the State Water Resources Control Board pursuant to Water Code Sections 13290-13291.7 (see Attachment to Resolution No. R8-2004-0037 – Task 5).

Comment 22
Tasks 8 and 9 of Appendix A should be revised to only name the entities owning the lakes. This would be consistent with recent positions taken by EPA, the State, and other Regional Boards that indicate that owners of facilities are responsible for the pollutants that they accept into their facilities.

Staff Response
The Regional Board regulates dischargers of waste. WLAs must be assigned to dischargers, not to the owners who receive the discharge. (40 CFR 130.2(h).) Lake Elsinore is not a "facility"; the MS4 system is a facility. The co-permitees are responsible for what comes out of the MS4 system pursuant to the MS4 permit.

Comment 23
Local governments were specifically and conspicuously excluded from 40 CFR 130.2(p)(2)(i); therefore all costs of implementing any task in the Basin Plan Amendment associated with nonpoint source pollution should be funded by the State as required by the Clean Water Act.

Staff Response
The District appears to be referring to a version of regulations that never came into effect. The 2000 regulations were adopted by the Clinton administration, but Congress barred enforcement and the Bush administration withdrew them. There is no section 130.2(p) in title 40 of the CFR. The regulations that currently apply are those that were issued in 1985 and amended in 1992 (40 CFR Part 130, Section 130.7).

Urban runoff, including stormwater, is regulated as a point source pursuant to an adopted areawide MS4 NPDES permit. Therefore, the urban component was properly assigned WLAs.

Staff would also like to point out that substantial State and federal funds ($65+ million) have been to improve Lake Elsinore and the watershed. Please see also the response to comment 12.

RCFCD Comments in ATTACHMENT F OF THE LETTER- Specific Comments on Lake Elsinore and Canyon Lake Nutrient TMDL Report

Note: Staff does not expect to revise the TMDL Report presented at the Regional Board workshop on June 4, 2004. A separate staff report that describes proposed changes to the Basin Plan amendment based on consideration of comments received will be prepared. Nevertheless, the following responses to the comments on the TMDL Report are provided.

Comment 24
Pg. 6, 1st paragraph – Discussion should also include note that the lake occasionally goes dry, even before the levee was built.

Staff Response
Pg. 7, first paragraph states .."Lake Elsinore was completely dry in the 1950s and 1960s." This is shown graphically in Figure 2-2 on p.7.

Comment 25
Pg. 6, §2.2 – Discussion should acknowledge MSHCP will set aside vacant/open space land from being developed.

Staff Response
Comment noted. Future review/refinement of the TMDLs may entail update of land use information for allocation purposes. Set-asides of vacant/open space lands can be taken into account at that time.

Comment 26
Pgs. 6, 7, and 8 – The cutoff channel around Mystic Lake carries little sediment because it has a low capacity. The bypass channel has not substantially changed the historic sediment inflow to Mystic Lake. Approximately every ten years on the average, there is enough rainfall in one year to produce flows in the San Jacinto River near Mystic Lake.

Staff Response
Comment noted.

Comment 27
Pg. 17 Section 4.1.1 - During the reference state year of 2000-2001, Lake Elsinore had an average phosphorus concentration of .12 mg/L with no apparent algal blooms or fish kills and the lake was at an acceptable operational level. The use of the 25 percentile numeric target of 0.1 mg/L for the interim represents a direct 17% decrease in the waste load allocations for the watershed. While we recognize the need for a MOS, the 25% numeric target seems excessive.

Staff Response
Please see the responses to comments 1, 6 and 15. The proposed compliance schedules allow for the collection and analyses of additional data, and the proposed implementation plan calls explicitly for monitoring and update of the models used to develop the TMDLs.

Comment 28
Pg. 18, Table 4-2 – The Annual Average Total P should be reported in mg/L for direct comparison with the proposed numeric targets.

Staff Response
Comment noted.

Comment 29
Pg. 20 – Is there conclusive data to back up the claim that the floodwaters of 1993 and 1995 "carried high nutrient loads from the San Jacinto watershed to Lake Elsinore"?

Staff Response
The TMDL Technical Report presented at the June 3, 2004 workshop indicates that "Flood waters **likely** carried high nutrient loads from the San Jacinto River watershed to Lake Elsinore..." This is supported by data that indicate that the TP concentration in Lake Elsinore increased from non-detect to 0.65 mg/L from December 1992 to January 1993, an increase that can only be attributed to stormwater runoff.

Comment 30
Pg. 23, §4.2.3 – As fish kills in Canyon Lake are based solely on anecdotal evidence, the first sentence should read: "Control of dissolved oxygen is important for Canyon Lake since the depletion of oxygen may have caused occasional fish kills, and has caused high nutrient flux rates...."

Staff Response
Comment noted.

Comment 31
Pg. 47 – "...the LSPC model [developed by Tetra Tech] was never calibrated for the wet scenario". In fact, the model had very poor hydrologic calibration with the rainfall vs. runoff for the observed data that year. Since the proposed TMDLs are sensitive to these wet year calibrations, the TMDL numeric target implementation should be delayed until the wet year condition model can be calibrated.

Staff Response
Please see responses to comments 4, 11 and 15.

Comment 32
Pg. 50 – In Table 5-10b there appears to be an error in the moderate year section where the TN load from Canyon Lake sediment is included in the Lake Elsinore totals but not the TP load.

Staff Response
Actually, this is not an error. The EFDC simulated export of total phosphorus load to Lake Elsinore from Canyon Lake was zero.

Comment 33
Pg. 61, Equation 3 – TP target should be changed to C_{ss} to be consistent with the text that follows.

Staff Response
Comment noted. As stated above, no changes to the TMDL Report are proposed or necessary.

Comment 34
Pg. 66, first full paragraph – The last sentence states that "no reduction in the internal load of phosphorus for Canyon Lake" will be assumed as lake management studies have not been conducted. In wet years, approximately 40% of the phosphorus mass load to Lake Elsinore comes from Canyon Lake. As elimination of all inputs to Canyon Lake would not lead to a reduction of total phosphorus in the lake, loads leaving Canyon Lake in a wet year could lead to Lake Elsinore TMDL load targets not being met. This is a concern if enforcement action results when Lake Elsinore target loads are exceeded.

Staff Response
First, it is likely that measures to reduce total phosphorus in Canyon Lake will need to be implemented in the future. Thus, the proposed implementation plan explicitly requires evaluation of Canyon Lake sediment nutrient treatment options (Task 9). Second, reduction in nutrient loads to Canyon Lake will ultimately reduce the nutrient loads going out to Lake Elsinore. If the target loads from Canyon Lake to Lake Elsinore are exceeded, then investigation of the cause(s) and appropriate solution(s) will need to be conducted. The Regional Board retains enforcement discretion based on the circumstances, including whether or not responsible parties have made good faith efforts to comply.

Comment 35
Pg. 82, paragraph before §11.A. – The potentially affected parties will be asked to evaluate the TMDL-related costs. Any information the Regional Board already has should be provided.

Staff Response
Any information submitted to the Regional Board becomes a matter of public record. The supplemental staff report that will be prepared to describe changes to the proposed Basin Plan amendment is expected to include additional information concerning costs, based on comments received.

Comment 36
Pgs. 86 – Several dischargers have provided economic information for nutrient treatment management measures and water quality monitoring. This information should be summarized in Section 11 (Economic Considerations) and Table 13-1 (Nutrient Management Projects table).

Staff Response
Please see response to comment 35.

Comment 37
Pg. 87, Item C. – Local tax funds are listed as a source of public financing by the local agencies. In November 1996, California voters approved Proposition 218 ("The Right To Vote On Taxes Initiative") amending Article XIII of the State Constitution[1]. Proposition 218 produced changes to some of the Permittees' historic funding sources and still looms as a potential threat to others. Additionally, with the current budget crisis in California and Riverside County, local agencies are being required to make across-the-board cuts in public programs, including police and fire protection and higher education.

Staff Response
Comment noted. Also, please see response to comment 3.

Comment 38
Attachment A, Page 2, Item 1., 2nd paragraph – Fish kills in Canyon Lake based solely on anecdotal evidence (Report, pg. 23). The sentence should indicate so.

Staff Response
Comment noted. No changes to the TMDL Report are proposed or necessary.

Comment 39
Attachment A, Page 10, 1st paragraph – Flexibility should be allowed to move or remove stations that are not providing useful information for the TMDL model or that present a risk

[1] The Proposition 218 amendments require voter approval of any new taxes, fees, assessments, etc. In addition, certain existing taxes and assessments were subject to the Initiative's voter approval requirements. "Special taxes," as defined by the Initiative, require a 2/3rds majority while other types of assessments may only require a simple majority. In addition, voter approval is required to raise any existing special tax or assessment rates.

to personnel during sampling events. Both the listing of stations and their sampling frequency are located in Table 5-9t.

Staff Response
The monitoring stations were carefully selected by the stakeholders and all the sites have been evaluated for safety concerns. Nonetheless, staff agree that changes to the monitoring stations may be warranted. Staff proposes to add language allowing flexibility in developing the monitoring programs (see Attachment to Resolution No. R8-2004-0037, Task 3).

Comment 40
Attachment A, Page 17, Task 6 – The Santa Ana Drainage Area Management Plan (DAMP) is currently being developed in a phased manner according to the time schedules in Board Order R8-2002-0011. The DAMP is to be submitted to the Executive Officer no later than January 1, 2005. Attachment A, Pages 18 and 19, Tasks 8 and 9 – The tasks require a proposed plan and schedule to evaluate in-lake sediment nutrient reduction and treatment as well as a monitoring program. The purpose of the monitoring program is to evaluate the effectiveness of the strategy that is implemented, and as such, the location of monitoring stations will necessarily come after the strategy is adopted. Establishing monitoring stations just for collecting "data" will not be a judicious use of public funds.

Staff Response
Staff is unclear about the intent of this comment. Tasks 8 and 9 of the proposed Basin Plan Amendment require responsible parties to develop schedules and plans to implement sediment control strategies for Lake Elsinore and Canyon Lake, respectively. These tasks also require that as part of the submittal of the sediment reduction strategies, a monitoring program to evaluate effectiveness is also required. The monitoring program would be implemented as an element of the implementation of the sediment reduction strategy. The responsible parties have flexibility to recommend a suitable monitoring program.

Comment 41
Attachment A, Pages 19 and 20, Tasks 10 and 11 – Nowhere in the task descriptions does it say that the Regional Board will assist in procuring funding. Regional Board staff's efforts to procure state and federal grant funding was vital to the success of the initial TMDL monitoring efforts, and the Permittees hope that these efforts will continue.

Staff Response
It is certainly Board staff's intent to continue efforts to procure funds that will support TMDLs.

Comment 42
Attachment A, Pages 19 and 20, Tasks 11 & 12 – The review/revision of the Lake Elsinore/Canyon Lake Nutrient TMDL would need to be accomplished prior to the review and revision of water quality objectives. It is recommended these two tasks be switched so that Task 11 is the review/revision of nutrient TMDL and Task 12 is the review/revision of the water quality objectives.

Staff Response
As indicated in the description of Task 13 (previously Task 12 in the May 2004 draft Basin Plan Amendment), the Regional Board is committed to the review of these TMDLs every three years, or more frequently if warranted by consideration of additional data and information. It is appropriate to review the status and efficacy of the TMDLs even though the review of water quality objectives is not complete.

Comment 43
Attachment B, Items I (Aesthetics) and IV (Biological Resources) – BMPs or treatment measures constructed to meet the interim and final TMDL targets could be aesthetically unpleasing due to large land requirements. Such lands may include those currently supporting riparian habitat or sensitive species. This needs to be acknowledged in the Environmental Checklist.

Staff Response
Staff agree that there may be potential impacts to aesthetics and biological resources from the implementation of BMPs and have revised the environmental checklist accordingly. It is important to note that any potential impacts potential impacts would be subject to further site-specific CEQA analysis and certification.

Dick Watenpaugh
City Manager, City of Lake Elsinore
(letter dated May 24, 2004)

Comment 44
The quality of life for the citizens of Lake Elsinore is fundamentally dependent on the quality and quantity of water in Lake Elsinore. There is great diversity of frequently competing interests within the Lake Elsinore and San Jacinto River watershed. The City of Lake Elsinore's jurisdictional ability to control nutrients from the watershed is less than 5% of the entire watershed.

Staff Response
Comments noted. The significance of the Lake as a resource is recognized in the TMDL documents. The purpose of the TMDL is to improve and protect that resource via control of nutrient inputs from all significant sources throughout the Canyon Lake/Lake Elsinore watershed.

Comment 45
All inhabitants of the watershed contribute to the nutrient problem and therefore, all must also contribute to solving the Lake's problems in order to protect the beneficial uses of the Lake. Lake Elsinore will never be Lake Tahoe but reasonably strict controls must be set in motion to prevent nuisance conditions and protect beneficial uses. Hopefully, the Regional Board will remain engaged in the long-term challenge to address problems in the Lake through adoption of the phased Nutrient TMDL.

Staff Response
Comment noted. In staff's opinion, all major nutrient sources have been identified in the proposed TMDL and control actions for reducing nutrient loads are specified. Staff believes that the implementation of the proposed TMDL and Implementation Plan would result in meaningful water quality and beneficial use improvements for Lake Elsinore.

Pat Kilroy
Director of Lake and Aquatic Resources, City of Lake Elsinore
(letter dated June 3, 2004)

Comment 46
The monumental effort to consolidate available data for the Nutrient Source Assessment was hampered by the relevance of the historic data and by the nature of data collection in an arid watershed. Future monitoring will improve model accuracy and provide a useful nutrient reduction tool.

Staff Response
Staff has acknowledged in the technical TMDL report that the development of the TMDL relied to a large extent on the use of the watershed water quality simulation models and that data to allow calibration of wet conditions were lacking. Nonetheless, the recommended TMDLs are based on the best scientific information available for the watershed. As a phased TMDL, the recommended implementation plan includes specific

monitoring requirements to ensure that data gaps are filled, as well as specifying requirements for the update of the models.

Comment 47
The Nutrient Source Assessment focused on the export to the lakes of nutrients from multiple land uses, but failed to quantify the major sources of nutrients to the watershed itself. Source control will ultimately reduce the mass of nutrients transported to the lakes.

Staff Response
As required, the nutrient source assessment evaluated the likely sources of nutrients from the San Jacinto River watershed to the lakes, given land use conditions in 1993. This is the definition of a source assessment to support development of a TMDL. Mr. Kilroy is essentially recommending that the TMDL include an analysis of the specific sources of nutrients, e.g., fertilizer addition, manure, etc., and whether, through source control, such specific sources of nutrients could be reduced. This effort is outside the scope of what is required as part of the source assessment and is best left to the responsible agencies to investigate as part of their efforts to comply with established wasteload and load allocations. Staff agrees that this evaluation by responsible agencies and parties is a critical component for implementation of the proposed TMDLs. We expect the implementing agencies and parties to conduct this evaluation in order pinpoint appropriate steps to mitigate nutrient inputs from their jurisdictions.

Comment 48
Given the arid conditions in the San Jacinto River watershed, the use of a conventional phased TMDL, adjusted based on annual water quality monitoring, is not practical. Given hydrologic conditions in the watershed, which are characterized by floods and droughts, the infrequent monitoring that is likely to be feasible is insufficient to implement the TMDL program in a timely manner. Different environmental factors require a different approach.

Staff Response
Staff agrees that the unique hydrology of the San Jacinto River watershed poses challenges for developing, implementing and refining the Lake Elsinore and Canyon Lake Nutrient TMDLs. Given the long-term precipitation history in the watershed, there is likely to be limited data collected for the wet conditions. Nonetheless, staff believes that recommended approach for addressing nutrients emanating during wet conditions is feasible and necessary and will address the long-term build-up of nutrients in the lake sediment.

Comment 49
The proposed interim numeric target for chlorophyll *a* was nearly achieved during 2000-2001,a period preceded by 2-3 years of no significant inflow into the lake. This shows that in just a few years without nutrient input to the Lake, it is possible to reduce algal levels low enough to approach the near-term goal. Implementing remediation measures (lake stabilization, aeration and fishery management) will further reduce algae levels to achieve the algal biomass goal.

Staff Response
Comment noted.

Comment 50
A large shallow lake that is the terminus of a large watershed and located in an arid region is ecologically hyper-sensitive to nutrient pollution. The trophic state of the Lake [Elsinore] prior to European civilization is not known, but an on-going sediment geochronology study may provide clarification of the extent to which man's presence has accelerated eutrophication. Recent monitoring data collected for the TMDL development shows the extent to which nutrient concentrations in flows that enter Lake Elsinore are elevated when compared to nutrient concentrations emanating from the mountain areas.

Staff Response
Comment noted. Board staff recognizes that eutrophication of lakes is a natural process that may take thousands of years. Given that Lake Elsinore is a natural lake, one would expect the lake to become eutrophic over a span of years. However, it should be recognized that the approach staff is recommending is not to take Lake Elsinore back to an oligotrophic or mesotrophic status, but to maintain the lake conditions at the 'better' end of the eutrophic scale. This approach would prevent further eutrophication as the result of anthropogenic activities and improve water quality and beneficial uses.

Comment 51
The 10-year running average approach for the TMDL, wasteload allocations (WLA) and load allocations (LA) conflicts with the 5-year schedule for re-evaluation of the TMDL. The proposed 10-year approach is proposed to address the varied hydrological conditions in the watershed, but this might not be appropriate either given the unpredictability of these conditions. The TMDL, WLAs and LAs should be set as 5-year running averages in order to be consistent with the proposed 5-year TMDL review schedule.

Staff Response
Task 13 (previously Task 12) of the proposed Basin Plan amendment (Attachment to Resolution No. R8-2004-0037) specifies that the TMDL, WLAs and LAs would be reviewed at least once every 3years in order to coincide with the Regional Board's triennial review process. This would include review of the status of submittal/implementation of reports and tasks required by the TMDLs, as well as the status of compliance with the WLAs and LAs. Initially after the date the TMDLs become effective, compliance with the proposed 10-year running average WLAs/LAs could not be judged for a period of ten years. However, that does not preclude interim assessment of the efficacy of control measures implemented to begin to achieve compliance. Further, once the initial ten-year period has elapsed, compliance could be judged annually, if desired, given that the WLAs/LAs are expressed as running averages.

Staff believes that specifying a compliance schedule of 10 years is the most reasonable method for implementing the TMDL in this watershed. Staff recognizes the varied nature of precipitation and that a significant wet event may not occur in the 10-year period, however, the same circumstances could occur during a 5-year period. Based on a review of the long term flow records, staff believes that the wet events occur every 7 to 8 years. Therefore a 10-year running average approach appears to be reasonable.

Comment 52
The mean annual overflow from Canyon Lake to Lake Elsinore (using a 73 year record) and the annual runoff from the local Lake Elsinore watershed should be used as the

bases for specifying gradual reductions in phosphorus concentrations. Based on the proposed phosphorus WLA for local Lake Elsinore urban runoff, the urban stakeholders would be required to lower total P concentrations to a degree (0.05 mg/L) that is not reasonable in the proposed timeframe (by 2015) and that is much more restrictive than upstream stakeholders. Mr. Kilroy presents tables showing a scheme for the gradual reduction of phosphorus from both the upper watershed and the local Lake Elsinore watershed.

Staff Response

Based on the Tetra-tech modeling analysis, the existing load of phosphorus from urban discharges in the local Lake Elsinore watershed is 124 kg/yr, which is the same as the proposed interim WLA (see Table 7-1 of the Technical TMDL report). Mr. Kilroy implies that meeting this allocation is unfeasible, however, (again based on model predictions), this allocation is currently being met and no further reductions would be needed for urban discharges to meet the Lake Elsinore interim WLA.

The approach outlined in the table discussed by Mr. Kilroy has a couple of significant flaws. First, the values in the table listed as 5-year averages are not 5 -year averages. Instead, they are a calculation of the total flow over a 5 year period. Second, the proposed WLAs are not linked to compliance with the proposed numeric targets, as required. Mr. Kilroy's proposed approach would significantly and unnecessarily limit TMDL refinement and implementation flexibility.

Staff certainly supports the notion of urban dischargers (and all other discharges, in fact) developing a gradual reduction scheme for ensuring that the interim and final numeric targets are met. We don't believe, however, that the proposed scheme for annual reduction requirements should be included as part of the Basin Plan. This would greatly reduce the flexibility that staff has tried to incorporate into the recommended TMDL to allow dischargers to develop schedules and priority projects based on what they believe would work for them. It is entirely feasible that a discharger could achieve no reduction in year 2, but have a 50% or more reduction in year 5 due to the implementation of some type of project. Therefore, staff does not recommend any changes to the recommended TMDL and Basin Plan amendment based on this comment.

Comment 53

The recommended monitoring program requirements are too costly and are inadequate to characterize and assign responsibility for the phosphorus loading from all sources within the 760 square mile San Jacinto River watershed.

The phosphorus WLAs and LAs are calculated by multiplying the water flow volume by the phosphorus concentration. There is nothing inherently polluting from the volume of water flowing to the lakes. Rather, the concentration of a pollutant contained in the flowing water fundamentally determines the mass of pollutant transported. The Regional Board has no reason to limit the volume of flow from the San Jacinto River. A maximum nutrient threshold concentration should be applied to all sources as a matter of equity. A secondary phosphorus concentration threshold of 0.5 mg/L for flowing water in all tributaries to the San Jacinto River should be developed to facilitate pollutant source-tracking, timely "'cause & effect" compliance, equity and reduced sampling costs".

Staff Response

Staff notes that Mr. Kilroy was an active participant in the development and implementation of the nutrient source assessment monitoring program that he now finds flawed. Staff believes it has been a very successful program for collecting data and information on nutrient loading from the watershed. One of the goals of program was to develop a sampling protocol that could be used long-term for TMDL program implementation. The Lake Elsinore and San Jacinto Watershed Authority (LESJWA) has invested a significant amount of their Prop. 13 budget to support the TMDL monitoring program. Certainly, as the stakeholders move toward TMDL implementation, refinement of the monitoring program is feasible and desirable. However, in staff's opinion, the proposed TMDLs properly identify the minimum number of sampling stations and analytical parameters needed to continue to fill in data gaps, update the watershed model and determine progress toward compliance with the TMDL, WLAs and LAs.

Staff agrees that the Regional Board has no reason to limit the volume of flows entering the lakes, and the proposed TMDLs do not attempt to do so. Sections 6 and 7 of the Technical Report describe the derivation of the TMDLs, WLAs and LAs in detail. The TMDLs are weighted average loads that account for the anticipated flows, based on the historical record of hydrologic conditions. The WLAs and LAs are derived in turn from these weighted average loads. The mass load approach is necessary to address the cumulative nature of nutrient build-up in the lakes. Nutrients entering the lake remain in the lake for years and make a continuing contribution to the internal sediment load. The concentration-based approach suggested by Mr. Kilroy would not address this concern. The comment letter from Mr. David Smith, US Environmental Protection Agency confirms this. Mr. Smith points out that "...concentration-based allocations alone...would permit massive nutrient loading into the lake sediments during moderate and wet years, which would then cause eutrophic and impaired conditions in moderate and dry years." Mr. Smith indicates support for staff's proposed mass loading approach. (See also comment 109).

It is not clear to staff that the secondary, concentration-based approach recommended by Mr. Kilroy would accomplish the goals he has identified. This proposal would necessitate developing a monitoring program that could conceivably involve many more sampling station locations and/or require additional personnel, and therefore cost savings may not be realized. Mr. Kilroy's proposed approach would likely result in inconsistent monitoring that is conducted year to year as different sampling points would potentially be used each year, resulting in data that could not be compared year-to-year. Further, in staff's opinion, the recommended approach would result in an unrealistic regulatory burden. For example, if phosphorus concentrations measured at a site in the City of Hemet were 0.6 mg/L would that be considered non-compliance under Mr. Kilroy's approach, and if so, what steps would be taken? Additional sampling at that site to confirm an exceedance or enforcement actions by Regional Board or other responsible agency? In addition, it may be that the flows from the one site in Hemet with phosphorus concentrations at 0.6 mg/L have little likelihood of reaching Canyon Lake and/or Lake Elsinore. Spending time taking an enforcement action provides little benefit to water quality. It is for that reason, that staff is recommending a flexible implementation plan that allows the dischargers to collectively craft their monitoring program, BMPs or other control measures that make sense for the watershed.

Comment 54
Water quality indicators, bioassay studies and nutrient studies demonstrate that phosphorus is the limiting nutrient for algae growth in Lake Elsinore .The nutrient studies indicate that nearly all the nitrogen added to the Lake [Elsinore] is generated internally through nitrogen fixing blue-green algae. The best way to control nitrogen input to Lake Elsinore is to limit phosphorus, since this would reduce the biomass of nitrogen fixing bacteria. Mr. Kilroy recommends that a total ammonia standard for the San Jacinto River be established and that either the nitrogen target be set using a 15:1 nitrogen to phosphorus ratio (instead of the proposed 10:1), or the nitrogen targets, TMDL, WLAs and LAs be eliminated.

Staff Response
As discussed in the TMDL Report, for Lake Elsinore, staff agrees that the primary limiting nutrient is phosphorus. However, staff also notes that recent studies conducted by Dr. Anderson indicate that Lake Elsinore is trending toward nitrogen limitation (R. A. Viega Nascimento, M. A. Anderson, "Lake Elsinore Recycled Water Project", Draft Final Report, August 2004). Therefore, staff believes it is critical that the TMDL address both nitrogen and phosphorus. Given, that nitrogen is not the primary limiting nutrient for Lake Elsinore, staff agrees with Mr. Kilroy's recommendation to use the upper range of nitrogen to phosphorus ratio of 15:1 as the proposed numeric target. The revised proposed Basin Plan amendment reflects this change in revised nitrogen TMDLs, numeric targets and wasteload and load allocations. (The use of the TN:TP ratio to determine the limiting nutrient is a rough estimate. If the ratio is greater than 20:1 then the lakes are considered P-limited. If the ratio is between 20:1 and 10:1, then the lakes are considered co-limited by both N and P. If the ratio is less than 10:1, then the lakes are considered N limited. There is a debate in literature about the exact ratio and even the validity of this method. However, many limnologists find this method easy and convenient to use. Other methods are used to determine the limiting nutrient as well, such as bioassay (artificially adding P and N to monitor the algal growth)).

As was also discussed in the TMDL Report (see Section 4.2), nitrogen is the primary limiting nutrient in the main body of Canyon Lake, although phosphorus can be the limiting nutrient both spatially (e.g., the East Bay) and temporally. Therefore, in staff's opinion, to control algae growth in Canyon Lake, the TMDL must address both phosphorus and nitrogen. The proposed nitrogen TMDLs, numeric targets, and wasteload and load allocations for Canyon Lake have been also revised to reflect the 15:1 TN:TP ratio to assure consistency.
With respect to eliminating the nitrogen targets, TMDL, WLAs and LAs for Lake Elsinore, staff does not agree. Again, the nitrogen TMDL and allocations address eutrophication in Canyon Lake and at the same time will ensure protection of aquatic wildlife in both lakes from un-ionized ammonia toxicity. Nitrogen discharged from the watershed to Canyon Lake and Lake Elsinore results in the accumulation of nitrogen in the sediment. Nitrogen is converted to ammonia and can 'flux' back into the water column. As noted in the Fishery Management Plan prepared by Leidy and Associates, un-ionized ammonia may be partly responsible for historic fish kills. Controlling phosphorus inputs to Lake Elsinore but not controlling nitrogen inputs may result in less fish kills due to low dissolved oxygen, but may not mitigate fish kills due to un-ionized ammonia toxicity. The May 21, 2004 TMDL Report indicated that ammonia targets would be specified in the proposed TMDLs, but these were inadvertently omitted from the proposed Basin Plan amendment. This

oversight has been corrected in the revised amendment. The proposed ammonia numeric targets are based on the national ammonia criteria, however, it may be appropriate to establish site-specific un-ionized ammonia objectives for both Canyon Lake and Lake Elsinore. Developing an un-ionized ammonia site-specific objective can be a very time intensive and costly process, and stakeholder funding support will be needed to accomplish this effort. Staff recommends that this effort be added to the proposed Basin Plan amendment, Task 12 – Review and Revision of Water Quality Objectives.

Comment 55

The TMDL Implementation Plan should include specific recommendations for changing land use practices in the San Jacinto River watershed and a timetable for compliance. The TMDL program is necessary due to the failure of technology-based BMP standards to protect the Lake. An example is the dairy regulatory program. According to the Regional Board report, "Dairies and Their Relationship to Water Quality Problems in Chino Basin" (1990), the Board limits the amount of manure that can be spread based on agronomic application rates for nitrogen. However, the amount of phosphorus contained in this allowable amount of manure far exceeds plant requirements and results in excess amounts of phosphorus applied to land. The 2002 Annual Report of Animal Waste Discharge (Regional Board report) provides data on the large amount of phosphorus added to the San Jacinto River watershed. The Regional Board should require soil testing and agronomic manure application rates for the pollutant of concern (phosphorus) based on existing USDA guidelines. Implementation of nutrient management plans by agriculture should be mandatory, not voluntary.

Staff Response

As Mr. Kilroy is likely aware, Regional Board staff is currently in the process of revising the general waste discharge requirements for confined animal feeding operations (dairies and related facilities – Order No. 99-11). The current draft of the dairy permit, scheduled to be presented to the Board this year, prohibits the application of manure (including its use as fertilizer) anywhere in the San Jacinto Basin, and prohibits the discharge of runoff from the dairies under most circumstances. The draft revised permit will include a time schedule in the permit to phase out land application of manure, and will allow dairy discharges in the event of chronic or catastrophic storm events.

Staff disagrees with the contention that all the phosphorus present in manure is "added to the San Jacinto Watershed." On the contrary, only phosphorus that enters surface water will impact Canyon Lake and Lake Elsinore. There is little potential for phosphorus to leach through soil into groundwater. Soil particles have a large capacity to fix phosphorus in forms that are immobile in soil. Most soils filter out soluble phosphorus as water passes through the soil profile into groundwater. Although the capacity of soil to adsorb phosphorus can be overwhelmed in sandy soils or when the water table is close to the soil surface, staff does not believe that this situation occurs in the San Jacinto Watershed. It is likely that most of the phosphorus applied in manure or fertilizer is fixed in the soil, and the critical issue is to control phosphorus in runoff from agricultural lands where manure was applied (i.e., implementation of appropriate BMPs) and the occasional runoff from dairies during catastrophic storms.

The proposed implementation plan for the TMDL requires the development of Nutrient Management Plans and the implementation of those plans upon Regional Board approval.

Comment 56
The multiple uses of reclaimed water in the San Jacinto River watershed provide a significant benefit to supplement the region's water supply. The production and use of reclaimed water should not be counterproductive to the Nutrient TMDL program. The waste discharge requirements for the use of reclaimed water throughout the watershed should be revised to meet the minimum treatment standard of best available technology (BAT) economically achievable for the removal of nutrients.

Staff Response
The proposed TMDL specifies wasteload allocations for the direct addition of recycled water to Lake Elsinore as a source of supplemental water supply. Compliance with these wasteload allocations will require POTW improvements to achieve BAT standards. However, staff does not believe that comparable requirements should apply to the production of reclaimed water to be used for landscape irrigation, etc. in the watershed. Waste discharge requirements for POTWs in the watershed require the producer and end user to contain the reclaimed water on-site (i.e, no discharges to surface waters tributary to the lakes are authorized). It's not clear whether the phosphorus present in reclaimed water used for irrigation contributes to the eutrophication of the lakes via transport through the vadose zone/groundwater flow. The San Jacinto Watershed nutrient management plan developed by LESJWA identified this as a data gap. If there is clear evidence that the reclaimed water used for irrigation is an important source of nutrients to the lakes that needs to be controlled, changes to the TMDL allocation scheme to control such sources can be considered.

Comment 57
Pollutant trading options should be based on scientifically defensible improvements to water quality. Not all pollutant trading is equal – to reduce algae growth, removal of soluble reactive phosphorus is needed instead of removal of particulate phosphorus. In addition to nutrient concentrations, lake level is an important factor for consideration, Lake Elsinore's high phosphorus internal load can be partially mitigated by the addition of a sufficient quantity of water. Pollutant trading proposals should be approved by the Regional Board, based upon an evaluation of their contributions to attainment of the algal biomass and dissolved oxygen indicators for the interim and final TMDL.

Staff Response
Staff agrees that the Regional Board should approve any pollutant trading proposal and has modified the proposed TMDL Basin Plan amendment appropriately. We also agree that pollutant trading proposals should result in meaningful water quality improvements that contribute to compliance with the numeric targets specified in the TMDL.

See also response to Comment No. 18

Comment 58
It should be stated in the TMDL that there is no relationship between the WLA for supplemental water and the LA for agriculture. Based on the unusual hydrologic condition

of the San Jacinto River Watershed, the supplemental water will only be added in years with low inflow from the Watershed.

Staff Response
Comment noted. The separate WLAs and LAs are explicitly identified in the proposed TMDLs and staff is not persuaded that there is a need to provide any additional clarification or qualification.

Bruce Scott
Agriculture and Dairy Industry Representatives in the San Jacinto River watershed (Oral comments received at the June 4, 2004 workshop)

Comment 59
Mr. Scott discussed the formation of the San Jacinto Watershed Council and the Western Riverside Agriculture Coalition. The goals of the Watershed Council and the Coalition are to bring stakeholders together and to assist the agriculture and dairy community in addressing not only TMDL issues, but CAFO permit issues as well.

Staff Response
Comment noted. Staff commends the proactive involvement of the agriculture and dairy community in dealing with TMDL issues. We note that Mr. Scott has been an active participant in TMDL stakeholder meetings and is always willing to engage Board staff and other stakeholders in addressing complex TMDL issues.

Comment 60
Mr. Scott expressed concern about data gaps, in particular, how Mystic Lake affects nutrient loading from the upper watershed. Mystic Lake only overflows approximately every 10 years. Nutrient discharges from the upper watershed do not affect the lower watershed (Canyon Lake and Lake Elsinore) and therefore should be of lower priority for implementation of nutrient controls.

Staff Response
Board staff recognizes that data gaps exist, particularly understanding the role Mystic Lake plays on the nutrient loads to the downstream lakes. In order to address data gaps, staff has proposed to continue the watershed (and in-lakes) monitoring programs to fill-in data gaps. Board staff also proposes to review and revise, if necessary, the TMDLs, wasteload allocations and load allocations, if warranted by new data or studies (Draft Implementation Plan - Task 12).

Comment 61
Mr. Scott emphasized that limited dollars should be spent where it will achieve the biggest reduction. It may not make sense to implement nutrient reduction on a watershed-wide basis, given that the upper watershed contributes to the downstream area (below Mystic Lake) approximately once every 10 years. One dollar spent on a project for nutrient control that is effective and/or operates every year is money better spent than on a project that is only effective every tenth year. The funding should be spent where there is the most benefit in reduction.

Staff Response
Staff agrees that TMDL implementation efforts should be focused on nutrient reduction projects on a priority basis. This type of strategy can be proposed by the watershed stakeholders, either collectively or individually, as they develop their implementation programs. Further, staff supports a pollutant trading program in the watershed to encourage stakeholders to implement projects operated on or near the lakes, where the benefits from reduction strategies would be most beneficial. Given that the Regional Board cannot specify what BMPs or projects should be constructed to meet the wasteload and load allocations, a reasonable approach that staff could support is for all watershed

stakeholders to form a task force or committee to look at all the nutrient reduction options on a watershed-wide scale, prioritize projects, identify funding mechanisms, and conduct the necessary studies to formulate the exact projects that are most cost efficient. Staff recognizes that this has been done to some extent in the development of the San Jacinto Nutrient Management Plan (Tetra Tech, Inc., 2004).

Comment 62
Mr. Scott asked that the Riverside County Flood Control and Water Conservation District re-open and re-address the San Jacinto River Master Plan. The current Master Plan addresses Reach 4 and Reach 3, however, the Mystic Lake area is not considered in the Master Plan or addressed in updates to the Master Plan.

Staff Response
Board staff recognizes that there have been no flood control projects planned for the Mystic Lake area. However, this issue is out of the scope of the TMDL process. As discussed above, Mystic Lake and the role Mystic Lake has on water quality in the two lakes downstream requires further study. As part of the San Jacinto Watershed Nutrient Management Plan, a study to collect data on Mystic Lake is proposed. Board staff supports this project.

Comment 63
Mr. Scott indicated that the agricultural industry is working with U.C. Riverside Cooperative Extension to develop an Agricultural Nutrient Management Plan.

Staff Response
UC Cooperative Extension was awarded a federal nonpoint source grant to develop the Agricultural Nutrient Management Plan. Recognizing the importance of addressing nutrients in the San Jacinto watershed, Board staff worked closely with the UC Cooperative Extension and Pat Boldt Consulting to secure the grant. Regional Board staff will continue to work and coordinate with the agricultural community as the grant is executed. Board staff is also committed to assist the agriculture community in identifying and securing additional funding opportunities to implement nutrient controls.

Comment 64
Mr. Scott indicated that, to be equitable, all industries -- urban, agriculture, or others -- should implement BMPs to address the problem.

Staff Response
Board staff agrees and the proposed TMDLs require load reductions from all sources in order to meet water quality standards.

Sid Sybrandy
Dairy Industry Representative in the San Jacinto River watershed
(Oral comments received at the June 4, 2004 workshop)

Comment 65
Mr. Sybrandy discussed the formation of the San Jacinto Watershed Council and the Western Riverside Agriculture Coalition. Mr. Sybrandy noted that he serves as the Coalition Chairman. Mr. Sybrandy indicated that the Coalition intends to work with the Regional Board to protect the environment and water quality.

Staff Response
Comment noted.

Anthony J. Pack
General Manager
Eastern Municipal Water District (EMWD)
(letter dated June 28, 2004)

Jayne Joy
EMWD
(Oral comments received at the June 4, 2004 workshop)

Comment 66
The numeric targets have been set without the benefit of understanding the resulting effects of recycled water discharge at its current quality. Recycled water is used as a supplemental water source only in times of dry weather to ensure and stabilize the lake level. Because of this lack of understanding of the effects of recycled water addition, numeric targets had to be based on limited analytical data and literature values. Factors such as economics, wet-weather characteristics and lake dynamics were not considered in the establishment of the target values simply because they're unknown.

Staff Response

Federal TMDL regulations require that quantifiable and measurable numeric targets that will ensure compliance with water quality standards (including beneficial uses and water quality objectives) be established in the TMDL. The proposed numeric targets were established based on the best data available and application of model analyses and best professional judgement concerning the levels of nutrients, chlorophyll a, and dissolved oxygen that would assure that water quality standards for the lakes are met. Data deficiencies are explicitly acknowledged and reflected in the proposed compliance schedules and implementation plan requirements for monitoring (including the collection of wet-weather data), model updates and periodic review of the TMDLs to consider appropriate refinements. It is important to point out that identification of numeric targets cannot be based on economic factors. Rather, as specified in federal regulations, the targets and TMDL must be established to ensure the protection of beneficial uses and compliance with established water quality objectives (narrative and numeric objectives) under all hydrologic conditions. (Please see also the response to Comment 3).

The Regional Board amended the existing NPDES permits for both EMWD and Elsinore Valley Water District (EVMWD) to allow the discharge of a specific amount of recycled water to Lake Elsinore. The permit amendments enabled the implementation of a 2½ - year pilot project designed to evaluate the effects of recycled water on lake water quality. The pilot program permit is scheduled to expire on December 1, 2004. The Regional Board approved the amendments recognizing the significance of lake level on water quality and beneficial uses in the lake, and the need to forward efforts to identify some reasonable balance.

Staff recognizes that the final evaluation report for the recycled water pilot project (and monitoring program) has not yet been prepared. The final report is due to be completed later this year. However, several quarterly reports have been prepared since the beginning of the pilot project (June 2002). Data summarized in the quarterly reports show that current phosphorus and nitrogen concentrations in the recycled water are much

greater than the in-lake phosphorus and nitrogen concentrations. In addition, the relative percentage of nutrient mass loads from the recycled water discharge to Lake Elsinore have been much greater than the relative percentage of nutrient loads from all other waters. In other words, with the discharge of recycled water at current quality to Lake Elsinore, the lake is receiving a small volume of water, but relatively speaking, a large amount of nutrients (4th Quarterly report by UCR, 2003). It is staff's opinion that nutrients entering the lake in recycled water discharges will be bound in the lake sediment and subject to re-release to the water column. The impact of this nutrient load will likely last for many years and could potentially thwart other nutrient sediment reduction projects such as aeration. Technology exists to improve recycled water quality. While the lake level benefits are recognized, it is both necessary and reasonable to require recycled water quality improvement.

Comment 67
EMWD recommends that the establishment of TMDL standards be postponed until the recycled water pilot program is complete and lake dynamics are understood. Then, appropriate target levels can be established.

Staff Response
The Regional Board is obligated to adopt TMDLs, including numeric targets, for impaired waters such as Lake Elsinore and Canyon Lake. The TMDLs must be based on the best data available and are subject to review and refinement as uncertainties are addressed. (See also response to Comment 66).

It is evident to staff that controlling nutrient loads to Lake Elsinore, including those in recycled water, is essential to reduce algal biomass and the depleted dissolved oxygen conditions that cause or contribute to fish kills. The proposed TMDL, including the wasteload allocations and load allocations, are based on the best available data concerning the nutrient load reductions necessary. However, a phased TMDL approach is recommended given the recognition that nutrient dynamics in the lake are very complex and that a full understanding of these dynamics and the most effective and efficient nutrient control measures is not likely to be attained for many years. As additional data are collected and as a better understanding of lake nutrient dynamics is obtained, such as through implementation of the LESJWA projects (e.g., aeration and biomanipulation), the TMDL and its components can be revised accordingly. The compliance schedules proposed by staff allow for this refinement.

Comment 68
TMDL Guidance indicates that an adequate basis for an interpretation of water-quality standards is required. Since Lake Elsinore does not have phosphorus water quality objectives, the numeric targets would become the standards as a placeholder. Further, because the numeric targets would become, by default, water quality standards, the Porter-Cologne Act requires economic analysis should be conducted.

Staff Response
Staff in unclear to which guidance is being referenced. . Nevertheless, we certainly agree that the numeric targets, and other components of the TMDL, should be based on sound data and analyses. The proposed numeric targets are based on the best available data and best professional judgment of the targets necessary to assure that narrative water

quality objectives are attained and beneficial uses are protected. Numeric targets are not water quality standards. They are an interpretation of existing water quality standards. If and when sufficient data are obtained to establish phosphorus and nitrogen water quality objectives for the lakes, additional analysis as required by the California Water Code §13241 would apply. If staff believed at this time that the proposed numeric targets would be appropriate as water quality objectives, staff would have made this recommendation as part of the TMDL process. It is staff's opinion, however, that additional monitoring data are needed prior to establishing numeric nutrient water quality objectives for Lake Elsinore or Canyon Lake. This is reflected in the recommended Implementation Plan (Task 11). In Task 11, staff proposes that review and revision of nutrient water quality objectives be completed by 2009.

Comment 69
EMWD raised concerns that in the next six months, the proposed objectives or targets would be put into permits. Therefore, they are water-quality objectives. EMWD contends that, since water-quality objectives do not exist, setting a numeric target value should include all of the factors required for establishing water-quality objectives.

Staff Response
See response to Comment 68

As discussed at length in the TMDL report, Section 6 - Linkage Analysis, the proposed numeric targets are used to derive appropriate wasteload and load allocations for all discharges that affect the lakes. This takes into account the nutrient dynamics of the lakes, as they are currently understood, and assumes some transformation of nutrients through the various in-lake processes. Numeric targets would not be specified as discharge limits, but are used to develop the proposed wasteload allocations, which would be implemented through permit limitations. For the recycled water discharges, Board staff assumed discharge quality of 0.5 mg/L phosphorus to meet the interim phosphorus numeric target of 0.1 mg/L; to meet the final proposed numeric target of 0.05 mg/L, recycled water discharges would be limited to 0.2 mg/L. These concentrations are based on assumed discharge volume needed to maintain Lake Elsinore lake elevation and consultant studies on achievable discharge concentrations. For nitrogen, staff assumed a discharge quality of 1 mg/L to meet the proposed interim and final nitrogen targets. Again, the discharge limit is based on consultant studies regarding the nitrogen levels that can be achieved in recycled water.

As stated above, since the proposed numeric targets are not being recommended as water quality objectives, California Water Code requirements (§13241) do not apply. Nonetheless, pursuant to CEQA requirements, the Board is required to take economics into consideration. As part of the TMDL development process and stakeholder meetings, staff has solicited economic information from stakeholders, including EMWD. With respect to the economic impacts, EMWD has indicated that the costs to treat their effluent would be approximately $37,000,000. Staff notes that as part of the Lake Elsinore Nutrient Removal Study funded by LESJWA and prepared by CH2MHill, chemical phosphorus treatment for both EVMWD and EMWD recycled water would cost approximately $8,000,000 in construction and capital costs and an additional $300,000 in annual O&M costs. For biological phosphorus treatment, CH2MHill reports construction and capital costs to be approximately $20,000,000, with annual O&M cost of

approximately $300,000. The CH2MHill report also discusses other treatment methods such as wetlands or chemical-physical treatment that could be utilized as well. The report states that treatment costs could be recovered through the sale of reclaimed water. Staff is unclear as to why there is this discrepancy in estimated treatment costs. Staff will continue to work with EMWD and EVMWD to verify recycled water cost projections. The dischargers are also encouraged to research treatment options and costs with other POTW operators within and outside California.

Ron Young
General Manager
Elsinore Valley Municipal Water District
(letter dated June 3, 2004)

Comment 70
Lake Elsinore is unique because it is an eutrophic, ephemeral lake subject to extreme fluctuation in water supply and external and internal nutrient loading due to the desert climate. Because of this unique status, the traditional approach does not adequately portray the necessary requirements or physical conditions that need to be addressed to establish the TMDL. The Regional Board should continue its TMDL hearings and not schedule action until EVMWD's expert analysis is fully reviewed and presented.

Staff Response
Another TMDL workshop at the regular Regional Board meeting on September 17, 2004 is scheduled. No action by the Board will be taken at the September 17th workshop. Elsinore Valley Municipal Water District (EVMWD) will have ample time to present their analysis to the Board. It is worth pointing out that the unique nature of Lake Elsinore is recognized in the proposed TMDL, as reflected both by the 10-year running average approach recommended to judge compliance with the wasteload and load allocations and by the phased nature of the TMDL.

Comment 71
Unlike most lakes, the role of nutrients and thus TMDLs in Lake Elsinore is subordinate to lake level or the climate. Because of their minimal impact, it is unlikely that the TMDLs as proposed will bring any noticeable increase in beneficial uses. However, the lake can be improved without the traditional imposition of more restrictive TMDL values. Other than a stable level target, the only other target needed is that the dissolved oxygen (DO) standard should be raised to 5 mg/L throughout the water column. High benthic DO would reduce fish kills and reduce the release of toxic ammonia. The N, P and chlorophyll-a standards are unrealistically low for a lake with such a high ratio of watershed to lake surface area. These targets would not provide acceptable water clarity or protection from fish kills or algal blooms.

Staff Response:
Staff recognizes the importance of dissolved oxygen and thus has proposed to use it as one of the TMDL numeric targets. However, based on consideration of this comment, staff proposes to revise the DO targets initially recommended. Specifically, as shown below and in the revised proposed Basin Plan amendment, Table 5-9n, the final DO target for Lake Elsinore and the interim DO target for Canyon Lake would be revised to delete references to the 2mg/l concentration goal.

Indicator	Lake Elsinore	Canyon Lake
...		
Dissolved oxygen concentration (Interim)	Depth average no less than 5 mg/; to be attained no later than 2015	Minimum of 5 mg/L above thermocline ~~and no less than 2 mg/L in hypolimnion~~; to be attained no later than 2015
Dissolved oxygen concentration (Final)	No less than 5 mg/L 1 meter above lake bottom ~~and no less than 2 mg/L from 1 meter to lake sediment~~; to be attained no later than 2020	Daily average in hypolimnion no less than 5 mg/L; to be attained no later than 2020.

The Basin Plan specifies that the dissolved oxygen for waterbodies designated WARM, including Canyon Lake and Lake Elsinore, shall not be depressed below 5 mg/L. The Basin Plan does not identify the depth over which compliance with this objective is to be achieved, nor does it reflect seasonal differences that may result in DO variations associated with stratification in the lakes. The revised proposed targets are consistent with the Basin Plan DO objective and take into account the conventional sampling protocol (i.e., dissolved oxygen is measured at 1 m intervals). The revised targets also reflect uncertainty about the efficacy of proposed aeration projects, and about the degree to which nutrient reductions will result in dissolved oxygen increases. As the relationship between nutrient input and dissolved oxygen levels in the lakes is better understood, the TMDL targets for dissolved oxygen will be revised appropriately to ensure protection of aquatic life beneficial uses.

Staff does not agree that only a dissolved oxygen target is needed for Lake Elsinore. While adequate dissolved oxygen concentrations may indeed prevent fish kills, fluctuations in dissolved oxygen levels are directly related to nutrient input. Dissolved oxygen is a response variable intended to assess the overall lake health; however, according to federal law and regulation, the TMDLs must also include targets that are directly related to the "polluting parameters", in this case phosphorus and nitrogen.

Comment 72
High benthic DO is needed to attain the already agreed upon N and P offsets for import of reclaimed water.

Staff Response
Staff is not aware of any agreed upon offset program. Currently, recycled water is discharged to the lake as part of a pilot project intended to evaluate whether reclaimed water additions are feasible for Lake Elsinore. Permit authorization for the pilot program is scheduled to expire in December, at which time a full assessment of the viability of the continued addition of reclaimed water will be made. [Staff notes that requests to extend the pilot project have been made; continuation of the project would require amendment of the POTW waste discharge requirements at a public hearing.]

Comment 73
The lake model seems to indicate that an increase of water level will be more beneficial than implementation of watershed TMDLs and conversely, that a reduction in water levels will overwhelm any benefits from TMDLs. The issue of a stable and high lake level is not addressed adequately in the TMDL report. A water level of 1246 ±1.0 ft msl should be established as a long-term numerical TMDL target. This corresponds to a limnologically more meaningful 26 feet maximum water depth.

Staff Response
The effect of lake levels on water quality in Lake Elsinore was discussed in the TMDL report (sections 2.3, 3.1, and 6). The significance of a high, stable lake level is recognized and was a key consideration in the Regional Board's decision to authorize the recycled water discharge pilot project. A lake level target could be included in the TMDL, but doing so would not obviate the need to identify nutrient load reductions. While lake level affects the impacts of nutrient loads coming into the lake, the nutrients themselves are the cause of algal blooms that contribute to impairment of beneficial uses. As discussed in the TMDL report, staff developed TMDL and allocation schemes that take into account all of the various hydrologic conditions in the watershed and the resulting lake levels.

Comment 74
Improvement in beneficial uses can be achieved by methods, primarily biomanipulation, that are not typically employed by TMDLs. Good water clarity is only achievable with biomanipulation, which requires a stable lake level. Biomanipulation and long-term in-lake TMDL management targets (methods) should be set in place of numerical nitrogen, phosphorus, chlorophyll or Secchi target (concentrations).

Staff Response
As discussed in the staff report (and in the response to Comment 71), federal regulations require the Regional Board to establish quantifiable and measurable numeric targets that will ensure compliance with water quality standards (beneficial uses and water quality objectives). The proposed targets for nitrogen, phosphorus, chlorophyll and dissolved oxygen comply with these regulations. They are measurable water quality parameters that can be used to track the water quality condition of the lakes.

Staff agrees that biomanipulation and other in-lake treatment methods for Lake Elsinore are projects/plans that are important for restoration of Lake Elsinore. They are, however management activities intended to achieve the specific water quality targets. It is staff's opinion that implementation of any of the in-lake treatment programs are not viable long-term solutions unless controls to address future nutrient inputs are taken as well. It is entirely likely that the benefits achieved through the implementation of biomanipulation or calcium treatment could be un-done by 1 year of moderate rainfall and nutrient input.

Comment 75
No targets for in-lake nutrients (N and P) should be set with the exception of the DHS rule of less than 10 mg/L as N for Canyon Lake (protection of drinking water).

Staff Response
See response to Comment 74. TMDL numeric targets must be based on existing water quality standards and ensure protection of all beneficial uses. Studies have shown that phosphorus is an important nutrient that stimulates algal growth in both Lake Elsinore and Canyon Lake (Anderson, 2000, Anderson and Oza, 2003). In addition, un-ionized ammonia concentrations in Lake Elsinore have exceeded ammonia toxicity criteria (US EPA, 1999). In order to control the excessive algal production and prevent ammonia toxicity, nutrient input to the lakes needs to be controlled.

Comment 76
Nitrogen should be defined as biologically available total inorganic nitrogen (TIN) not total nitrogen (TN) (TIN+biologically unavailable organic-N) for in lake targets and lake models.

Staff Response
Staff disagrees. Nutrient cycling in the lakes can be very rapid. Organic nitrogen can be transformed to ammonia, which is bio-available for algae activity. Therefore, TN is a better and more conservative indicator than TIN.

Comment 77
Phosphorus should be defined as either 80% total phosphorus (TP) or bio-available TP.

Staff Response
Staff disagrees. The ratio between bio-available phosphorus to TP varies greatly for the lakes. During storm flows, the ratio can be greater than 80%?. During the summer time, the ratio is much lower in the epilimnion; most of the bioavailable phosphorus is taken-up through algae growth. The P in the hypolimnion is mostly bioavailable phosphorus, due to the sediment release of soluble reactive phosphorus (SRP)[2]. When lakes turn-over and the hypolimnion and epilimnion water mixes, the ratio of bio-available to total phosphorus in the water column becomes uniform again. In addition, research has shown that the relationship between TP and algal uptake rate is stronger than the relationship between SRP and algal uptake rate (Hudson, J. J., Taylor W. D. and Schindler, D. W., "Phosphate Concentrations in Lakes", Nature, Vol. 406, pp 54-56, 2000.) Therefore, TP is a better indicator of lake eutrophic status.

Comment 78
The lake level versus fish kill section should be reconsidered in the light of the lake model now available and with consideration of other opinion.

Staff Response:
Staff does not propose to revise the Technical Report. Certain changes to the recommended TMDLs are being proposed in response to comments. Staff does not believe that this comment warrants any such change.

Staff agrees that the relationship between lake level and fish kills is very complex. The main cause of fish kills has been depletion of oxygen, which is caused by many factors, including algal blooms and climate. The TMDL Technical Report observed that in the

[2] In most cases the bio-available P is equivalent to the SRP.

1990s (e.g., 1995), several fish kills occurred either after heavy rainfalls that brought significant nutrient runoff to the lake or when the lake levels were very low (*e.g.,* 2002).

Draft Review by Dr. Alex Horne (Memo to Phil Miller, EVMWD, May 24, 2004)
(Note: The review/comments by Dr. Horne were used as the basis for the comments and recommendations submitted by Ronald Young of EVMWD. Only those comments/recommendations not included in the EVMWD letter are presented below, with appropriate responses.)

Comment 79
A more rational ratio of TIN : 80% TP should be used to show if there is a relative shortage of P and N. The reduction of N and P from the watershed requires very different emphasis and technology. The reduction of N and P is best done in parallel with TIN and TP being kept at a constant 10:1 ratio. Use of TN to TP will obscure the balance in the desired ratio and provoke increased growth of blue-green algae.

Staff Response:
Staff now recommends that the TN numeric target be revised based on a TN :TP ratio of 15:1 (see response to Comment 54). Staff does not believe that it is appropriate to use a TIN:80% TP ratio, since nitrogen and phosphorus cycling can be very rapid in the lakes and the ratio of soluble phosphorus to TP varies greatly in the lakes and watershed. See also responses to Comments 76 and 77.

Use of Total N and total P is a better and more conservative representation of nutrient levels. Staff acknowledges that treatments for N and P are quite different. Staff also acknowledges that the understanding of the nitrogen cycle in the lakes is limited, *e.g.*, the amount and rate of N fixed by blue-green algae (cyanobacteria), denitrification, and mineralization.

Comment 80
Algal growth in Lake Elsinore is limited by light and CO_2, not nitrogen or phosphorus, as stated in the draft TMDL.

Staff Response
Lake Elsinore algal biomass (as indicated by chlorophyll a) responded positively with the addition of phosphorus in the lab experiments conducted by Anderson (2001), which indicates that phosphorus is the limiting nutrient at the time. However, as phosphorus concentrations have steadily increased in the last few years, the chlorophyll concentrations have not increased proportional to the increased phosphorus concentrations (the predicted chlorophyll of 595 ug/L vs. the observed chlorophyll a concentrations of 200 ug/L) (Anderson, 2004, personal communication). This suggests that the lake is over-enriched with nutrients (phosphorus and nitrogen) resulting in dense populations of algae that compete for available light. In staff's opinion, the fact that light has become a limiting factor is the direct result of available nutrients that promote excessive algal growth. It is the overabundance of nutrients that needs to be controlled in order to prevent the excessive growth of algae that compete for light. Both phosphorus and nitrogen concentrations must be reduced to control algal blooms effectively.

Comment 81
It is difficult to set nitrogen and *phosphorus* TMDL targets in Lake Elsinore. Rather, the beneficial uses can be achieved by lake management methods such as biomanipulation that requires a relative stable water level.

Staff Response
See response to comment 74.

Comment 82
Fish kills in Lake Elsinore are not clearly related to water depth or to algal blooms. The lack of relationship is critical since the TMDL attempts to control algae blooms via nutrient reductions. There may be other reasons for the TMDL than fish kill reductions.

Staff Response:
The purpose of the TMDL is not simply to control fish kills but to address other impairment of the beneficial uses of the lakes, including the adverse effects of excessive algae growth on recreational uses and the diversity and abundance of the biota. Nutrient controls are a necessary part of a program to address excessive algae growth.

Staff agrees that lake levels do not seem to have a predictable effect on fish kills. Fish kills in Lake Elsinore are caused by low DO, and ammonia toxicity (EIP Associates, Draft Lake Elsinore Fishery Management Plan, 2004). The cause of low DO can be the result of respiration of the tremendous amount of organic debris due to high productivity of the lake, the high oxygen demand of the lake sediment, and extended periods of no wind action in the area. Staff also recognizes the difficulties in correlating low DO and algal blooms. It is generally understood that algal blooms exert high oxygen demand from the respiration of algae, the organic debris, even though the events may not always occur at the same time. In-lake treatments, such as aeration/oxygenation may increase oxygen concentration in the water column without any reduction in nutrient concentrations or algal production.

Gene Rogers
City Manager, City of Moreno Valley
(letter dated June 4, 2004)

Comment 83
The City of Moreno Valley budgets more than $1.2 million a year for its NPDES storm water program. This includes annual catch basin cleaning, street sweeping, inspection programs, illicit connection and discharge detection, and administration including management and maintenance of extended detention basins and constructed wetlands in new developments. The City is concerned that the model used to develop the proposed TMDLs did not identify the water quality benefits (pollution reductions) derived from our current and past management and pollution control practices.

Staff Response
Regional Board staff recognizes the City's stormwater program commitment, which has likely helped to reduce the pollutant loads to receiving waters. The benefit of the NPDES program in pollutant load reduction has not been quantified for the San Jacinto River watershed. The nutrient source assessment model simulated nutrient loads from land use types in the watershed based on the land use information in 1990s. To the extent that stormwater program implementation by the City and other municipalities in the watershed has resulted in decreases in these loads, then those efforts have forwarded compliance with the proposed TMDLs and wasteload allocations. Implementation of the City's program does not obviate the need to meet those allocations. Monitoring is a requisite component of the proposed TMDL implementation plan. New data collected regarding nutrient loads from different sources, including municipal stormwater, will be used to refine the models, which may lead also to refinement of the TMDLs/wasteload allocations.

Comment 84
Moreno Valley agrees and supports the concept that both lakes be stabilized for recreational uses and benefit of the cities. However, Moreno Valley does not agree with the TMDL model providing a Waste Load Allocation for supplemental water. Moreno Valley believes that the WLA for supplemental water as currently modeled should be allocated to the other land uses. Any assignment of a WLA to supplemental water should be done through pollutant trading with the appropriate stakeholders.

Staff Response
Staff understands the concerns of Moreno Valley that a WLA for supplemental water means less TMDL allocation available to other sources. The proposed inclusion of a WLA for recycled water input to Lake Elsinore reflects the reality that this supplemental water is likely to be necessary under certain conditions to prevent the lake from drying out, or at least to maintain a stable lake level. The TMDL Technical Report and comments from other parties emphasize the significant effects of lake level on water quality and beneficial uses. Obviously, beneficial uses are particularly impacted when the lake dries out. The proposed inclusion of a WLA also takes into account substantial efforts by the City of Lake Elsinore and Elsinore Valley Municipal Water District to identify a reasonable balance between quantity and quality issues, leading to the Regional Board's authorization of a pilot recycled water discharge project. The inclusion of a WLA for the recycled water would forward efforts to identify and implement solutions to the water quality and quantity problems confronting the Lake.

Comment 85
Moreno Valley is concerned that the City was identified to address nonpoint source pollution. Pursuant to 40 CFR 130.2 (p), the State is responsible for funding measures to implement load allocations assigned to nonpoint sources.

Staff Response
The City appears to be referring to a version of regulations that never came into effect. The 2000 regulations were adopted by the Clinton administration, but Congress barred enforcement and the Bush administration withdrew them. There is no section 130.2(p) in title 40 of the CFR. The regulations that currently apply are those that were issued in 1985 and amended in 1992 (40 CFR Part 130, Section 130.7).

Municipalities, such as Moreno Valley, are co-permittees of the stormwater NPDES (MS4) permit. This permit regulates urban runoff, including stormwater, as a point source. Therefore, the urban component was properly assigned WLAs.

Comment 86
Moreno Valley requests that the total atmospheric deposition be calculated for the entire watershed, removed from the other land uses and included as a LA in the model.

Staff Response
The nutrients from atmospheric deposition on the watershed enter the lakes via runoff and are accounted for in the load and waste load allocations. If the atmospheric deposition over the watershed received a LA, it would greatly reduce the share of the TMDL (LA and WLA) given to other sources.

Paul Lambert
District 8 NPDES Storm Water Coordinator, California Department of Transportation (letter dated June 4, 2004)

Comment 87
Our main concern is that this TMDL would require construction of treatment controls, not yet developed; however the benefit has not been demonstrated to justify the cost.

Staff Response
The Regional Board is required by law to establish TMDLs for waters that do not meet water quality standards, which include beneficial uses and water quality objectives. The economic feasibility to the dischargers of achieving the standards is neither relevant nor authorized when setting the TMDLs. As explained n the TMDL report, the costs of the methods of compliance must be considered by the Regional Board as part of the CEQA process for the proposed Basin Plan amendment. This does not require a cost/benefit analysis. Board staff would welcome information from the Department concerning the expected costs of anticipated methods of compliance.

Comment 88
The historical records show that the beneficial uses for Lake Elsinore have not been maintained continuously, e.g., during the drought of 1950s-1960s when the lake completely dried out. So even with the nutrient control measures, the beneficial uses are not protected.

Staff Response
Regional Board staff recognizes that when Lake Elsinore dries out, beneficial uses are not protected. This does not obviate the need to take appropriate steps to protect beneficial uses when water is present.

Comment 89
The Department is concerned to see that an allowable phosphorus concentration of 0.5 mg/L be allowed for recycled water that will be used to maintain lake level. The proposed TMDL indicates that the stormwater runoff have an ultimate concentration of 0.05 mg/L. It is unreasonable to expect that the currently available technology used for stormwater treatment could possibly achieve this level of performance. The TMDL has not shown the cost and the benefit of the treatment.

Staff Response
Please see the response to Comment 2 by the Riverside County Flood Control and Water Conservation District. The proposed TMDLs have phosphorus targets for the lake. No concentration limits are proposed for the urban runoff. As indicated in the response to the Department's first comment, it is not appropriate to consider economics when establishing the TMDLs.

Comment 90
The proposed Total Nitrogen targets are more stringent than the Basin Plan Objectives for Total Inorganic Nitrogen (TIN).

Staff Response
The TIN objective in the Basin Plan for Canyon Lake was established for drinking water protection from nitrate toxicity. It was not established to control excessive algal growth. Similarly, it is evident that the established objective for Lake Elsinore is not adequate. Both lakes have shown high ammonia concentrations, which have exceeded the ammonia toxicity criteria. Controlling total nitrogen may reduce algal biomass and thus reduce ammonia concentration.

Comment 91
The Department is concerned that there is a need to consider the cumulative cost and technical implications of these TMDLs combined with future TMDLs. The concern is that the cost for these TMDLs may be fundable but the full set of TMDLs may be far beyond available resources. Another concern is that the controls to implement this TMDL may not be compatible with the controls to implement future TMDLs. A watershed approach is needed that examines and prioritizes the overall water quality needs and assess the financial feasibility of achieving these goals.

Staff Response
Regional Board staff understands the concerns expressed. The fact that the nutrient TMDLs are now being considered, rather than other TMDLs required in the San Jacinto River watershed, reflects the high priority assigned to this source of impairment. Board staff work on other requisite TMDLs (pathogen TMDL for Canyon Lake, unknown toxicity and possibly, sediment TMDLs for Lake Elsinore) will make every effort to assure consistency and complementary, rather than redundant, requirements. As previously stated, federal law mandates that the Board adopt TMDLs that address impairment of water quality standards irrespective of financial feasibility. The proposed TMDLs include 10 and 15-year compliance schedules in part to allow responsible parties to identify and implement funding and technical solutions.

Comment 92
The Department is willing to partner with municipalities and other agencies on a pro rata basis to implement measures that are technologically feasible and justifiable economically. The Department facilities in the watershed are not a major source of nutrients contributing to the impairment of the lakes. Limiting use of chemicals in the agricultural practices within the watershed may be more effective in improving water quality of the lakes.

Staff Response
Regional Board staff appreciates the willingness of the Department to work on these TMDLs and certainly encourages the cooperative, multi-agency approach favored by the Department to identify technically sound and cost-effective measures. The Regional Board is required to identify all sources of nutrients contributing to the lakes, including agriculture and runoff. To the extent that agricultural practices can be more effective in achieving or exceeding the nutrient reductions required by the proposed load allocations, trading of nutrient input credits to the Department may be feasible.

Peer Review Comments from Dr. Michael Josselyn
(Received July 30, 2004)

Comment 93
Dr. Josselyn concurred with the finding that phosphorus is the limiting nutrient for both lakes and that controlling this nutrient will have the most substantial influence on algal growth in the water column. Dr. Josselyn suggested that it may be more appropriate to propose a TMDL for ammonia rather than for nitrogen to reduce potential ammonia toxicity.

Staff Response
The proposed targets in the Lake Elsinore and Canyon Lake TMDLs shown in the draft Basin Plan amendment presented at the workshop on June 4, 2004 included phosphorus, nitrogen, chlorophyll a and Dissolved Oxygen. Ammonia targets, discussed in the May 21, 2004 Technical Report, were inadvertently omitted from the proposed Basin Plan amendment. This oversight has been corrected in the revised amendment.

While phosphorus has been the limiting nutrient for Lake Elsinore in recent years, nitrogen can be the limiting nutrient for Lake Elsinore and Canyon Lake temporally and spatially. In order to control algal growth, staff proposes to control both nutrients.

Comment 94
Dr. Josselyn concurred with the statements that Lake Elsinore may be naturally eutrophic. He indicated that the targets for phosphorus as proposed reflect both the "natural" eutrophic nature of Lake Elsinore, the reality of high levels of phosphorus regeneration from the sediments, and the practicalities of trying to treat sediment in-situ. Dr. Josselyn stated that the shallow nature of the lake leads to wind re-suspension, a major source of phosphorus regeneration that cannot be controlled. Dr. Josselyn expressed the concern that the proposed reduction levels for phosphorus in Lake Elsinore rely significantly on proposals (aeration, alum treatments) that have not been tested for their effectiveness in this particular situation. Dr. Josselyn stated that given the seasonal stratification that occurs in Canyon Lake, he agrees that reduction in loading from external sources would be more effective in controlling phosphorus levels.

Staff Response
Staff proposes an implementation task to evaluate the in-lake treatment options to reduce internal nutrient loading from Lake Elsinore and to identify a plan/schedule for implementation of one or more strategies. (A task is also proposed for sediment nutrient treatment evaluation in Canyon Lake.) LESJWA has already conducted relevant studies in Lake Elsinore. The proposed treatment options include wetland treatment, aeration, metal salt addition and supplemental water for the lake. The compliance schedules proposed for the TMDLs allow assessment of the efficacy of these options. Where found necessary, changes to the TMDLs and implementation strategies can be considered.
At the present time, staff is not able to quantify the effect of nutrients from wind re-suspension on Lake Elsinore water quality, because the lake seems to have an active sedimentation process. Increase of the lake depth, and removal of carp should reduce the amount of nutrients released from sediment re-suspension.

Comment 95
Chlorophyll levels for Lake Elsinore appear to be appropriately estimated from proposed P concentrations and from other TMDLs in eutrophic lakes. Dissolved oxygen levels are appropriate for aquatic life.

Staff Response
Comments noted.

Comment 96
If oxygen levels can be maintained at higher levels (which are also directly related to eutrophic conditions) the targets could protect freshwater aquatic habitat and water and non-contact water recreation (the beneficial uses cited as impaired by the nutrient levels). It is not clear how other compounds or physical factors (high temperature, stratification) capable of having toxic effects on fish are playing a role in fish kills. However, personal observations at both lakes support a conclusion that excessive algal growth is a significant factor affecting both fisheries and human water contact. Therefore, the standards proposed for phosphorus should be most appropriate for controlling algae growth.

Staff Response
Comments noted.

Comment 97

The studies by Anderson (2001) and Anderson and Oza (2003) of internal nutrient sources are well documented and employ highly defensible scientific methods and analyses. A simulation model was used to evaluate external sources and staff noted that additional data will be needed to calibrate the model in wet years. Given that staff statement, Dr. Josselyn concurs that using the LSPC model to make estimates is the best approach available at this time.

Staff Response
Comments noted.

Comment 98
Dr. Josselyn stated that the averaging approach is a practical way to address the flood frequency and the variable nutrient loads associated with the floods. However, given that external loading is often only a factor during wet years, it may be more desirable to set loading criteria on the wet year source model results.

Staff Response
Model-simulated annual external nutrient loads to the lakes are shown in Table 5-9 of the May 21, 2004 Technical Report. While the estimated contributions from wet years substantially exceed those during dry and moderate conditions, it is appropriate to require that measures be implemented to control inputs under all conditions.

Comment 99
The nutrient mass balance models used are relatively simple and probably appropriate for Lake Elsinore, a terminal lake. Dr. Josselyn indicated that he did not have an opinion about the appropriateness of the model for Canyon Lake.

Staff Response
Comments noted.

Comment 100
The proposed targets rely heavily on controls for internal nutrient cycling for Lake Elsinore that may not be achievable for practical and methodological reasons. The staff need to demonstrate that such technologies as suggested could actually work in this system. Otherwise, further reductions in external loadings may be required. Other options for controls on release of water from Canyon Lake in wet years should be explored, such as wetland treatment ponds.

External source controls for Canyon Lake are clearly explained and the methods for affecting them are better known and available.

Staff Response
Staff relied on the limnocosm results that evaluated various in-lake treatment options. Staff acknowledges that further testing or pilot projects are necessary to test whether these technologies will work for Lake Elsinore. Staff also proposed such data gathering in the proposed implementation tasks. The TMDL will be reviewed and refined in future based on additional data collection and analyses. The proposed compliance schedules allow this additional evaluation to occur.

Comment 101
Until additional data can be developed for wet years, the weighted average external nutrient load capacity approach is the most practical. Dr. Josselyn noticed that the most significant source of nitrogen and phosphorus to Lake Elsinore during wet years is export from Canyon Lake. Therefore, source control would be much more difficult given sediment concentrations in Canyon Lake that might be re-suspended during a wet year event. The proposed sediment dredging for Canyon Lake might reduce this potential loading source to some unknown degree.

Staff Response
Staff agrees with Dr. Josselyn's suggestion that the proposed dredging might reduce this potential loading source. Task 9 of the proposed implementation plan requires that the stakeholders evaluate the effectiveness of various sediment treatment options in Canyon Lake. Dredging is certainly an option.

Comment 102
The methodology used to derive the WLAs and LAs is a standard approach used in other TMDLs. It is appropriate to specify the allocations as 10-year running averages, since this period would capture the various hydrologic events ranging from dry to wet years. Given the potential variation from year to year and the difficulty of regulating on a year-to-year basis, the weighted average method is the most practical approach to specifying the allocations.

Staff Response
Comments noted.

Comment 103
The margin of safety is incorporated in the conservative assumptions made throughout the analysis. The critical conditions are identified and addressed appropriately in the staff report.

Staff Response
Comments noted.

Comment 104
In response to the question posed by Regional Board staff regarding the need for additional implementation elements or studies to fill in data gaps and fine tune the TMDLs, Dr. Josselyn responded that the most important will be calibration of the LSPC model with actual conditions during wet years. Dr. Josselyn notes that Board staff proposes to continue to collect data and to adjust the standards as these data become available.

Staff Response
Comments noted.

David Smith
TMDL Team Leader
US Environmental Protection Agency Region IX
(letter dated June 3, 2004)

Comment 105
Mr. Smith urged the Regional Board to promptly adopt these TMDLs, consistent with the State's commitment in the State-EPA Performance Partnership Agreement to submit final TMDLs for these waters for EPA approval by 2005.

Staff Response
Comment noted. Staff has scheduled the second public workshop for the September 17, 2004 Regional Board meeting, and the public hearing for Regional Board consideration of the proposed TMDLs is tentatively scheduled for the December 17, 2004 Board meeting. Therefore, barring unforeseen circumstances, these TMDLs should be delivered to US EPA in mid-2005.

Comment 106
We have been working with Santa Ana RWQCB for several years on these TMDLs for Lake Elsinore and Canyon Lake. We have reviewed and commented throughout the TMDL development and implementation planning process.

Staff Response
Comment noted. Board staff have forwarded draft technical reports to our TMDL liaison, Dr. Peter Kozelka, for comments and review and have incorporated the informal and technical comments into the May 2004 TMDL Report. Dr. Kozelka has also participated in stakeholder meetings via teleconferences and answered questions from local stakeholders on relevant TMDL issues. His assistance and input to Regional Board staff has been vital to the development of the proposed TMDLs.

Comment 107
Mr. Smith stated that the beneficial uses of both Canyon Lake and Lake Elsinore have been impaired due to excessive nutrient input, and hopes that the Santa Ana Regional Board will take action to begin to restore the water quality in the lakes and meet all designated beneficial uses. Mr. Smith reminded Regional Board of its legal obligation, pursuant to the Clean Water Act and federal regulations (40 CFR 130.7(c)) to establish TMDLs for 3030 (d) listed waters.

Staff Response
Comment noted.

Comment 108
The TMDLs and Basin Plan amendment define interim and final numeric targets that are consistent with the existing applicable water quality objectives for Lake Elsinore and Canyon Lake. EPA's review of the proposed TMDLs indicate that they meet all federal regulatory requirements and will be approvable upon submittal to EPA.

Staff Response
Comment noted.

Comment 109
Mr. Smith strongly supported the Regional Board's proposal to define the TMDLs and allocations in terms of annual mass loads. This approach is technically appropriate given the long nutrient residence time in lakes and reservoirs and the fact that nutrient loads vary substantially from year-to-year due to variability in inflows to each lake.

Staff Response
Comment noted.

Comment 110
Mr. Smith believes that the Regional Board staff have developed flexible TMDLs using the best available information to date. The Basin Plan amendment outlines short- and long-term plans to address monitoring needs and improved hydrologic modeling. Mr. Smith stated that the implementation plan proposed by the staff included compliance schedules that are reasonable and provided adequate time for meeting the interim and final targets. Mr. Smith recommended that pH monitoring of lake water column be included to elucidate ammonia concentrations relative to the water quality objective.

Staff Response
Staff have revised the Basin Plan amendment to include pH as one of the monitoring parameters for the proposed lake monitoring program (see Attachment A, Task 3).

Comment 111
Mr. Smith commends staff for developing a reasonable TMDL plan that is consistent with federal requirements and will likely result in timely attainment of water quality objectives in these water bodies. It is vital for the Regional Board to adopt this amendment without delay and proceed to begin implementing measures to attain water quality standards.

Staff Response
Comment noted.

ATTACHMENT ~~B~~C

ENVIRONMENTAL CHECKLIST

I. BACKGROUND

1. **Project title:** *Basin Plan amendment to incorporate Nutrient TMDLs for Canyon Lake and Lake Elsinore in the San Jacinto River Watershed*

2. **Lead agency name and address:** *California Regional Water Quality Control Board, Santa Ana Region, 3737 Main Street, Suite 500, Riverside, CA 92501-3348*

3. **Contact person and phone number:** *Hope Smythe (909) 782- 4493*

4. **Project location:** *San Jacinto River Watershed, Riverside County (all or portions of Idyllwild, Hemet, San Jacinto, Perris, Moreno Valley, Canyon Lake, Lake Elsinore, Beaumont, and Murrieta)*

5. **Project sponsor's name and address:** *California Regional Water Quality Control Board, Santa Ana Region, 3737 Main Street, Suite 500, Riverside, CA 92501-3348*

6. **General plan designation:** *Not applicable*

7. **Zoning:** *Not applicable*

8. **Description of project:** *Adoption of a Basin Plan amendment to incorporate Nutrient TMDLs for Canyon Lake and Lake Elsinore. The TMDLs establish wasteload allocations and load allocations for allowable nutrient inputs by all identified sources that discharge to Canyon Lake and Lake Elsinore. The intent is to achieve numeric, water quality targets that will protect the beneficial uses of the lakes. The Basin Plan amendment includes an implementation that details the actions required by the Regional Board and other responsible parties to implement the TMDL.*

9. **Surrounding land uses and setting:** *Not applicable*

10. **Other public agencies whose approval is required:** *The Basin Plan amendment must be approved by the State Water Resources Control Board, the Office of Administrative Law, and the U.S. Environmental Protection Agency before it becomes effective.*

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:
The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agricultural Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology / Water Quality	☐ Land Use / Planning
☐ Mineral Resources	☐ Noise	☐ Population / Housing
☐ Public Services	☐ Recreation	☐ Transportation / Traffic
☐ Utilities / Service Systems	☐ Mandatory Findings of Significance	

II. DETERMINATION

On the basis of this initial evaluation:

X I find that the proposed project COULD NOT have a significant effect on the environment.

____ I find that the proposed project MAY have a significant effect on the environment. However, there are feasible alternatives and/or mitigation measures available that will substantially lessen any adverse impact. These alternatives are discussed in the attached written report.

____ I find that the proposed project MAY have a significant effect on the environment. There are no feasible alternatives and/or feasible mitigation measures available that would substantially lessen any significant adverse impact. See the attached written report for a discussion of this determination.

Signature _____ Date _____

~~Hope Smythe~~ Gerard J. Thibeault
~~Senior Environmental Specialist~~ Executive Officer

III. ENVIRONMENTAL IMPACTS

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS - Would the project:				
a) Have a substantial adverse effect on a scenic vista?			X	~~X~~
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) Substantially degrade the existing visual character or quality of the site and its surroundings?				X
d) Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?				X
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				X
III. AIR QUALITY - Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?				X
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?				X
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?				
d) Expose sensitive receptors to substantial pollutant concentrations?				X
e) Create objectionable odors affecting a substantial number of people?				X
IV. BIOLOGICAL RESOURCES - Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				X
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?				X
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X	
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X	
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X
V. CULTURAL RESOURCES - Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in ¤15064.5?				X
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to ¤15064.5?				X
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Disturb any human remains, including those interred outside of formal cemeteries?				
VI. GEOLOGY AND SOILS - Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				X
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?				X
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on-site or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				X
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				X
VII. HAZARDS AND HAZARDOUS MATERIALS - Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?				X
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?				X
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				X
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X
VIII. HYDROLOGY AND WATER QUALITY - Would the project:				
a) Violate any water quality standards or waste discharge requirements?				X
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site?				X
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-site or off-site?				X
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				X
f) Otherwise substantially degrade water quality?				X
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
h) Place within a 100-year flood hazard area structures that would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Inundation by seiche, tsunami, or mudflow?				X
IX. LAND USE AND PLANNING - Would the project:				
a) Physically divide an established community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X
X. MINERAL RESOURCES - Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X
XI. NOISE - Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				X
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				X
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				X
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
residing or working in the project area to excessive noise levels?				
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X
XII. POPULATION AND HOUSING - Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X
XIII. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services: Fire protection? Police protection? Schools? Parks? Other public facilities?				X
XIV. RECREATION - Would the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?				X
XV. TRANSPORTATION/TRAFFIC - Would the project:				
a) Cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?				X

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?				X
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?				X
f) Result in inadequate parking capacity?				X
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X
XVI. UTILITIES AND SERVICE SYSTEMS - Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				X
e) Result in a determination by the wastewater treatment provider that serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				X
g) Comply with federal, state, and local statutes and regulations related to solid waste?				X
XVII. MANDATORY FINDINGS OF SIGNIFICANCE -				

CEQA Checklist

Question	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?				X
b) Does the project have impacts that are individually limited, but cumulatively considerable? ('Cumulatively considerable' means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?				X
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?				X

Attachment - Environmental Checklist

Discussion of Environmental Impacts

Explanation of Environmental Checklist "Less than significant" Answers

Note: Adoption of the Basin Plan amendment to incorporate Nutrient TMDLs for Canyon Lake and Lake Elsinore will not have any direct impact on the environment. Implementation of actions necessary to achieve the TMDLs may affect the environment, as described below. However, the intent of TMDL implementation is to restore and protect the water quality of the lakes and their beneficial uses. Any potential adverse environmental effects associated with TMDL implementation will be subject to project-specific CEQA analysis and certification to assure appropriate avoidance/minimization and mitigation.

I. Aesthetics (a)

The proposed TMDLs call for reductions in nutrient loads to the lakes, which may include the implementation of BMPs that could be aesthetically unpleasing.

IV. Biological Resources (c), (d)

The proposed TMDLs call for actions to reduce internal nutrient loading to the lakes, which may include fishery management and sediment removal. Such actions would clearly affect, or have the potential to affect, the biota. Any such actions would be subject to specific CEQA analysis and certification, and would be intended to restore and protect the biological resources of the lake. In addition, BMPs or treatment measures constructed to reduce nutrient loads to the lakes may require large land acquisition. Such land may include those currently supporting riparian habitat or sensitive species. Any such actions would be subject to specific CEQA analysis and certification, and would be intended to restore and protect the biological resources of the lakes and San Jacinto River watershed.

XI. Noise (d)

Implementation of actions necessary to implement the proposed TMDLs may result in increases in noise levels. However, these effects are expected to be limited in scope and duration and are not considered significant. Again, proposed implementation actions would be subject to specific CEQA analysis and certification.

XVI. Utilities and Service Systems (b), (c)

The proposed TMDLs call for reductions in nutrient contributions to the lakes from septic systems and storm drainage systems. To achieve these reductions, modifications to the storm drainage system may be necessary. Similarly, it may be that septic system modifications, or connection of existing septic systems to sewer systems, will be necessary. Connection of existing septic systems to sewer systems may require collection and/or wastewater treatment plant modifications/expansions, with attendant construction-related environmental effects. In addition, wastewater treatment plant modifications may be needed to meet the nutrient wasteload allocations. Any such projects associated with septic, sewer or storm drainage systems modifications would be subject to further, case-specific environmental review and certification.

Attachment D

Lake Elsinore and Canyon Lake Nutrient TMDLs

Comment Letters

VARREN D. WILLIAMS
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RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

June 3, 2004

Mr. Gerard J. Thibeault
Executive Officer
California Regional Water Quality
Control Board - Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3339

Dear Mr. Thibeault:

Re: Comments on Draft Lake Elsinore and Canyon Lake Nutrient TMDL Technical Report

The Riverside County Flood Control and Water Conservation District (District) is the Principal Permittee on the Riverside County municipal separate storm sewer system (MS4) permit. In consultation with and on behalf of the Permittees in the San Jacinto watershed, the District is submitting the following comments on the Draft Lake Elsinore and Canyon Lake Nutrient TMDL Technical Report (Draft TMDL Report).

In summary, the science supporting the interim and final TMDL numeric targets total nitrogen and total phosphorous (numeric targets) proposed in the Draft TMDL Report is preliminary, yet the cost to the Permittees to comply with the proposed numeric targets are so significant as to render them infeasible. We have estimated the costs of compliance with the proposed TMDL numeric targets to potentially exceed hundreds of millions of dollars. There are four reasons for the significant financial impact:

1. Due to insufficient data, several conservative assumptions were made in the process of establishing the TMDLs. These assumptions led to the development of overly conservative (i.e., unnecessarily low) numeric targets.
2. The final TMDL numeric targets are at the extreme limit of existing BAT/BCT wastewater BMP technologies for removal of total nitrogen and phosphorous.
3. The interim TMDL numeric targets are beyond the treatment capabilities of conventional stormwater BAT/BCT based BMP technologies for removal of total nitrogen and phosphorous.
4. The wastewater and stormwater BMP technologies best capable of achieving the proposed TMDL numeric targets are expensive to implement and are only fiscally feasible for treating small volumes of runoff. These technologies are neither physically nor fiscally feasible for treatment of the large volumes of stormwater runoff that occurs during the wet year events.

The Permittees do not believe that it is the intention of the Board to impose TMDL numeric targets that would place the Permittees in a situation of unavoidable non-compliance. To successfully implement programs to improve the water quality in Canyon Lake and Lake Elsinore it is critical that the TMDLs adopted by the Board be technologically and fiscally feasible. The balance of this letter discusses the deficiencies in the TMDL model, the realistic expectation of results from implementation of the proposed TMDL numeric targets and the need for an economic analysis of impacts. The letter will also propose necessary revisions to the implementation plan, and provide recommendations for improvement of the proposed TMDLs and the science supporting it. Supporting data is provided where available. Specific and detailed position papers relative to each of these topics are also attached.

The modifications to the Draft TMDL Report released on Tuesday May 25, 2004 were extensive. Although the Permittees have determined that the proposed TMDL numeric targets are not technologically or fiscally feasible, we have not had sufficient time to fully review the Draft TMDL Report. Therefore, we are only able to submit preliminary comments at this time.

TMDL Numeric Limit Deficiencies

The Draft TMDL Report indicates that significant empirical data was collected regarding total phosphorus dynamics in Lake Elsinore. However, data did not exist to perform similar levels of analysis on numeric targets for total nitrogen at Lake Elsinore or for either total nitrogen or total phosphorus at Canyon Lake. Attachment A of the Draft TMDL Report states that the following assumptions were made for the purposes of margin of safety (MOS) to ensure that beneficial use objectives were met:

1. The derivation of numeric targets based on the 25th percentile of data for both lakes;
2. The use of conservative literature values in the absence of site-specific data for source loading rates in the watershed nutrient model;
3. The use of conservative assumptions in modeling the response of Lake Elsinore and Canyon Lake to nutrient loads; and
4. Requiring load reductions to be accomplished during hydrological conditions when model results indicate, in some instances, that theoretical loads could be higher.

Are TMDL Targets Realistic?

Based on a review of recent scientific literature, the proposed TMDL numeric targets derived from the conservative assumptions are not technologically feasible. It is unrealistic to expect attainment of the proposed numeric targets based on the conservative assumptions identified above. The following table briefly summarizes the Permittees research relative to the numeric targets:

PARAMETER	IRREDUCIBLE CONCENTRATION	LAKE INTERIM TARGET	WASTEWATER TREATMENT PLANT INTERIM TARGET	LAKE FINAL TARGET	WASTEWATER TREATMENT PLANT FINAL TARGET
Total Phosphorus	0.15 – 0.2 mg/L	0.1 mg/L	0.5 mg/L	0.05 mg/L	0.2 mg/L
Total Nitrogen	1.9 mg/L	1.0 mg/L	1.0 mg/L	0.5 mg/L	1.0 mg/L

The first column of the table indicates results of a study performed by the Center for Watershed Protection[1] that indicates the minimum irreducible concentrations that can be achieved based on current common treatment control technologies for stormwater. The values from the first column can be compared with the interim and final numeric targets established for the lakes (lake interim and final targets) and with the separate numeric targets established for discharges from wastewater treatment plant operators who provide supplemental water within the watershed (wastewater treatment interim and final targets). It is clear from a comparison that the interim and final numeric targets for the lakes are below the irreducible concentrations for total nitrogen and total phosphorus. It is also clear that the interim and final targets for the wastewater dischargers are significantly higher than the lake numeric targets, and in line with the irreducible discharges identified by the Center for Watershed Protection. If the discharges from advanced wastewater treatment plants cannot meet the numeric targets for the lakes, it is unreasonable to expect that any stormwater treatment process available to the watershed dischargers would be capable of meeting the proposed TMDL numeric targets!

In addition to technologic infeasibility, based on a review of the literature, compliance with the proposed numeric targets are not fiscally feasible for the watershed dischargers. As previously stated, the available wastewater and stormwater treatment technologies are expensive to implement and are only fiscally feasible for treating small volumes of water (the proposed Lake Elsinore treatment plant upgrade to add chemical total phosphorus treatment and filtration would treat approximately 8 MGD, at a cost of $1.4 million). Existing stormwater BMP technologies are also designed to treat small volumes of water, often less than 8 MGD (12.5 cfs). To illustrate this, consider that the Perris Valley Channel alone is designed to convey over 7,750 MGD, or nearly 1,000 times the volume of water treated at the current Lake Elsinore treatment plant. Further, when attempting to use BMPs to treat to the limits of a BMPs capability (irreducible concentration), treatment efficiencies tend to drop significantly for influent concentrations which are already as low as with stormwater nutrient concentrations).

The following table provides a preliminary estimate of the land costs for wetlands required for treatment of stormwater runoff at various inflow rates. The table also identifies influent concentration based on historical monitoring data and estimates of effluent concentrations based on wetland treatment. The costs presented in the last two columns are only for land costs and do not include costs for dry weather water demands, planting, operation or maintenance:

[1] *Irreducible Pollutant Concentrations Discharges from Stormwater Practices*, article 65, The Practice of Watershed Protection, editors Thomas R. Schueler and Heather K. Holland, published 2000 by the Center for Watershed Protection, Ellicott City, MD.

	Total Nitrogen		Total Phosphorus			Land Cost[2]	
Q_o (cfs)	TN_o (mg/L)	TN_f (mg/L)[3]	TP_o (mg/L)	TP_f (mg/L)[4]	Wetlands Area (ac)	Low	High
10[5]	3.04	1.51	0.66	0.10	3,620	$ 18.1 M	$94.1 M
104[6]	2.02	1.51	0.53	0.10	27,264	$136.3 M	$708.8 M
3710[7]	4.20	1.51	1.07	0.10	3,236,045	$16.2 B	$84.1 B

An evaluation of treatment technologies to achieve the TMDL targets in the watershed is presented in Attachment B. As described in this evaluation of wetlands treatment, the evaluation concludes that treatment to achieve the proposed TMDL numeric targets is fiscally infeasible.

Need for Economic Analysis

The proposed TMDL numeric targets for total nitrogen and total phosphorus are not fiscally achievable. The costs to achieve the proposed TMDL target receiving water concentrations and the relative value of the expected improvements in attainment of beneficial uses must be fully identified and considered in the issuance of the TMDLs. Section 13241 of the California Water Code specifically states that economic considerations must be considered by the Regional Board. The Superior Court of California has ruled that in amending a basin plan to include a TMDL, the same considerations must be made in the proposed TMDL as was in the adoption of the original basin plan:

> "Under the applicable statutory scheme Basin Plans (1) identify beneficial uses of water bodies to be protected; (2) establish water quality objectives to protect those uses; and (3) establish implementation programs for achieving the objectives.
>
> As such, Respondents are incorrect in stating no water quality objectives are implemented. It may be true the Basin Plan was only amended to add the TMDL, but if the TMDL was originally part of the Basin Plan it necessarily would have made economic considerations under Section 13241. It is certainly reasonable to conclude that when amending the Basin Plan the same considerations should be made."[8]

Attachment C explains this ruling in further detail. However, irrespective of any mandatory requirements to do so, the citizens of California justifiably expect their public decision-makers to fully assess the costs of proposed programs and requirements and to assess whether the anticipated benefits justify these costs.

---

[2] Based on San Jacinto River planning estimates for right-of-way acquisition – $5000/ac to $26,000/ac.
[3] Based on equation from Minton, 2002 – A total nitrogen effluent concentration less than 1.5 mg/L yields a complex solution.
[4] Interim TMDL goal.
[5] Hydron Data for 1998 readings at Perris-Nuevo USGS station.
[6] Hydron Data for 1998 readings at Elsinore USGS station.
[7] USGS highest daily mean for February 24, 1998, at Elsinore USGS station
[8] Statement of Decision. The City of Arcadia, et al versus The State Water Resources Control Board and the California Regional Water Quality Control Board, Los Angeles Region. Filed December 24, 2003. Page 13, lines 11-18.

Implementation Schedule

Several new projects and measures have recently been implemented or will be implemented within the San Jacinto watershed over the course of the next year. These programs include the implementation of the Permittee's Water Quality Management Plan for new development and redevelopment, a dredging project at Canyon Lake, and the Island Well Improvements at Lake Elsinore. The Permittees request that the TMDL implementation plan be revised to allow for the evaluation of the management measures either implemented or scheduled for implementation during the first five years (2005 – 2010) of the TMDL. In addition, we request that the TMDL specify that the first five years of the TMDL will be used to collect additional watershed and lake monitoring data, and implement test projects to analyze the effectiveness of potential nutrient control BMPs. The TMDL lake and watershed models should then be recalibrated with data collected during the five-year period. The revised results of the TMDL model can then be used to select appropriate management measures and numeric targets of total nitrogen and total phosphorous for implementation.

Recommendations

Based on our analysis of available BMP technologies, costs, and limited availability of local resources to implement the TMDL numeric targets, we have concluded that the Permittees would be in unavoidable non-compliance with the proposed TMDL. Further, this analysis would not be supportive of initiatives to secure additional local funding. Therefore, the Permittees recommend that the Regional Board direct staff take the following actions:

1. Delete the unattainable final numeric target criteria for total phosphorus and total nitrogen;
2. Review the conservative assumptions used to establish the numeric targets to see if the numeric targets can be set at or above the known nutrient irreducible concentrations and still be protective of Beneficial Uses;
3. Incorporate an economic analysis of the costs and benefits of the proposed TMDL;
4. Revise the implementation schedule to provide time to:
   - Allow dischargers to enter into an agreement to jointly fund and operate TMDL compliance programs, including submittal of necessary compliance documents;
   - As noted in the Draft TMDL Report, control of all external sources will not provide water quality benefits until internal sources of nutrients are controlled. The TMDL should therefore take a two-phased approach. The first phase, which may require five years, should focus on control of internal sources and identification controls that can effectively reduce the external loading of nutrients to Canyon Lake and Lake Elsinore.

     The first phase should also be used to:
     a. Analyze effectiveness of existing and scheduled nutrient control projects;
     b. Implement additional pilot nutrient control projects for both internal and external sources to determine which controls are effective and economically feasible;
     c. Gather and refine additional runoff and water quality data to accurately model the wet year runoff conditions;

d. Further develop the TMDL lake and watershed models and re-evaluate the TMDL numeric targets;

The second phase should require implementation of identified controls, as applicable and necessary, throughout the watershed. The Permittees believe that additional watershed controls should not be implemented until technologically effective and fiscally feasible programs for control of internal sources of nutrients can be implemented.

Additional recommendations and comments are provided in the attached position papers. The Permittees are submitting these initial comments as part of an on-going, open dialogue with the Regional Board to help develop appropriate, effective and workable TMDLs for Lake Elsinore and Canyon Lake. The Permittees are committed to water quality protection in a manner that balances this objective with the universe of needs and expectations of the citizens of California within the San Jacinto River watershed. We look forward to discussing the initial concerns of the Permittees and our proposal to work collaboratively to resolve these concerns at the June 4, 2004, Regional Board workshop.

In support of the District's position, the following documents are attached:

Attachment A – TMDL Nutrient Data Deficiencies
Attachment B – Are the TMDL Targets Realistic?
Attachment C – Need for Economic Analysis
Attachment D – Implementation Schedule
Attachment E – Recommendations
Attachment F – Report-specific comments

Please contact Stephen Stump at 909.955.8411 or Jason Uhley at 909.955.1273 of our Regulatory Division if you have any questions.

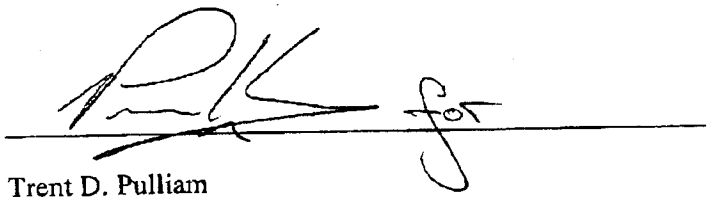
Very truly yours,

WARREN D. WILLIAMS
General Manager-Chief Engineer

JEU:LCG:ABC:cw
Attachments

PC/88370

THE CITY OF MORENO VALLEY JOINS IN THE COMMENTS SET FORTH IN THIS LETTER.

SIGNATURE 

PRINTED NAME Trent D. Pulliam

TITLE Public Works Director and City Engineer

DATED June 3, 2004

TMDL NUTRIENT DATA DEFICIENCIES

The following assumptions were made in the Draft Report based on the best available information to develop Margins of Safety (MOS) to ensure that Beneficial Use objectives were achieved:

1. The derivation of numeric targets based on the 25th percentile of data for both lakes;
2. The use of conservative literature values in the absence of site-specific data for source loading rates in the watershed nutrient model;
3. The use of conservative assumptions in modeling the response of Lake Elsinore and Canyon Lake to nutrient loads; and
4. The requirement of load reductions to be accomplished during hydrological conditions when model results indicate, in some instances, that theoretical loads could be higher.

Based on review of literature and evaluation of implementation costs, the proposed numeric TMDL targets derived from these conservative assumptions are neither technologically nor fiscally feasible. It is unrealistic to expect successful implementation of the proposed TMDL targets that are based on the conservative assumptions listed above.

The Draft Report indicates that significant empirical data was collected regarding total phosphorus dynamics in Lake Elsinore. However, the numeric target for total nitrogen (TN) concentrations was based on commonly accepted and conservative 10:1 ratio to the total phosphorus concentration (page 17). In addition, allowable concentrations for total phosphorus (TP) and TN at Canyon Lake were set based on "consistency with the proposed Lake Elsinore numeric targets" due to a lack of a reference state and supporting data at Canyon Lake (page 21).

It should be noted that the limnology of Canyon Lake is significantly more complex than that of Lake Elsinore. For example, Canyon Lake is sufficiently deep to allow stratification and is capable of trapping nutrients released from the lake sediments in the hypolimnion during the summer and preventing algal blooms (Page 22). Also, despite higher average nutrient concentrations, there is no reliable documentation that fish kills have occurred at Canyon Lake. Specific studies of algal productivity and lake conditions for both Lake Elsinore and Canyon Lake may demonstrate that allowable nutrient concentrations for TN (in both lakes) and TP (in Canyon Lake) can be increased without leading to impairment of beneficial uses. Increasing the allowable nutrient concentrations in the lakes could exponentially reduce compliance costs for Permittees.

Further, the Draft Report summarizes the findings of studies and models that have determined that the primary sources of nutrients leading to the impairment of Canyon Lake and Lake Elsinore are accumulated sediments. Two targets are proposed to reduce nutrient loading to Lake Elsinore – an interim 35% internal lake nutrient load reduction by 2015 and a final 70% internal lake nutrient load reduction by 2020. Although several in-lake nutrient control projects have been initiated at Lake Elsinore, their effectiveness has not been determined. During the TMDL Workgroup meetings, members of the Lake Elsinore and San Jacinto Watershed Authority (LESJWA) were not confident that the existing or soon-to-be completed in-lake

nutrient control projects would achieve a 35% reduction in internal lake nutrient loads. At both of the most recent TMDL Workgroup meetings, the District representative asked if any of the dischargers in the watershed believed that a 70% reduction was possible. None of the dischargers present, including representatives of LESJWA, believed that it was possible to achieve a 70% reduction. As described in the Draft Report, without the in-lake nutrient reductions, it would be impossible to meet the final numeric targets, even with the elimination of all external sources of nutrients.

Finally, the TMDL derivation period experienced below-average precipitation and sufficient flow did not occur to allow calibration of the models for wet year conditions. Thus, the TMDL models are not calibrated for wet conditions. Without this empirical data, it is not possible to verify the nutrient loads delivered to the lake, much less the accuracy of the individual discharger nutrient inputs during a wet-year scenario.

ARE TMDL TARGETS REALISTIC?

The Draft TMDL report uses the best available scientific information to determine the proposed TMDLs for nutrients necessary to protect the beneficial uses of Lake Elsinore and Canyon Lake. Based on this science, the Draft TMDL Report specifies a concentration based interim and final numeric target for the TMDLs, but does not analyze the technological feasibility or fiscal capability of the dischargers in the watershed to achieve the numeric targets. Based on our analysis, it is technologically and fiscally infeasible to meet the TMDL numeric targets.

It is important to note that Lake Elsinore, although one of the few natural lakes in Southern California is, in its natural state, eutrophic. The Draft Report clearly identifies that Lake Elsinore has been subject to extreme conditions including periods of a dry lakebed and extreme flooding. The eutrophic conditions, as well as sedimentation and fish kills, predate urbanization of the watershed (page 15). The beneficial uses identified for Lake Elsinore in the Basin Plan could not be attained under natural conditions. These beneficial uses can only be supported through the implementation of extreme and costly measures.

The Draft Report summarizes the findings of studies and models that have determined that the primary sources of nutrients leading to the impairments are the accumulated sediments within Canyon Lake and Lake Elsinore. These internal sources of nutrient loading are much greater than external nutrient loading from the watersheds. Without control of the internal sources of nutrients (e.g., sediment removal and/or sediment encapsulation) the proposed final nutrient targets cannot be met, even with complete elimination of external sources. The Draft TMDL Report proposes two targets to reduce in-lake nutrient loading at Lake Elsinore, an interim 35% reduction by 2015 and a final 70% reduction by 2020. For reasons identified below, it is likely that neither the interim nor final in-lake nutrient reductions are feasible. Without the specified in-lake nutrient reductions, expending the resources to meet the assigned Waste Load Allocations (WLAs) and Load Allocations (LAs) for the upstream watershed dischargers would not provide the desired water quality benefit.

The Permittees have reviewed available literature and interviewed various experts regarding the ability of existing stormwater and wastewater BMPs to reduce stormwater and wastewater nutrient loads to the specified numeric targets. These experts included staff at Orange County Water District who are implementing the Prado Wetlands, including Dr. Stephen Lyon and the author of Stormwater Treatment, Dr. Gary Minton. The TMDL targets are unachievable using current stormwater or wastewater BMP technology. This is documented in "Urban Stormwater BMP Performance Monitoring"[1], which presents a table of "irreducible concentrations" of selected parameters, the lowest concentration that can be achieved using existing BMPs. The table, reprinted below, and modified to include the interim and final numeric targets for the watershed dischargers and the interim and final numeric targets for wastewater treatment plant (supplemental water) discharges is:

[1] Urban Stormwater BMP Performance Monitoring, Table 2.9, pg. 33, prepared by GeoSyntec Consultants, Urban Drainage and Flood Control District, and Urban Water Resources Council of ASCE, in cooperation with EPA Office of Water, April 2002.

PARAMETER	IRREDUCIBLE CONCENTRATION	WATERSHED INTERIM TARGET	WASTEWATER TREATMENT PLANT INTERIM TARGET	WATERSHED FINAL TARGET	WASTEWATER TREATMENT PLANT FINAL TARGET
Total Phosphorus	0.15 – 0.2 mg/L	0.1 mg/L	0.5 mg/L	0.05 mg/L	0.2 mg/L
Total Nitrogen	1.9 mg/L	1.0 mg/L	1.0 mg/L	0.5 mg/L	1.0 mg/L

The irreducible concentrations for TN and TP are almost twice their respective interim targets, indicating that the interim targets, much less the final targets, may be unachievable with current BMP technology. The unattainability of these standards is further emphasized by the fact that the allowable nutrient effluent concentration from Eastern Municipal Water District's and Elsinore Valley Municipal Water District's wastewater treatment plants are only expected to achieve 0.2 mg/l phosphorus concentrations for the final target (page 73). The Draft Report, in footnote 14, even notes that compliance with this wastewater plant interim numeric objective may not be feasible for the wastewater treatment plants. The Permittees would note that the interim and final phosphorus concentrations, for which all other dischargers are expected to meet, is 0.1 mg/l and 0.05 mg/l – ultimately one tenth of the allowable discharge from the treatment plants. If wastewater treatment plants cannot meet the objectives specified for the lakes, it is unreasonable to expect MS4 dischargers in the watershed to meet the criteria, particularly considering they must manage episodic discharges with 1,000 times the volume experienced at wastewater treatment plants.

The types of technologies for treatment of urban runoff that have the theoretic potential to meet the proposed interim and final TMDL targets include treatment wetlands, filtration systems, and reverse osmosis. Based on technologies currently available, it is unlikely that any reasonably sized single treatment technology will be adequate to achieve the proposed TMDL targets. An analysis of these treatment technologies, including estimated costs, is presented in subsequent paragraphs. Because these technologies would be needed primarily during wet conditions, it is expected that facilities will need to be sized to address large volumes of water (possibly 7,500 MGD just for Perris Channel). Further, the capacity of all of these treatment technologies will be greatly underutilized in other than very wet conditions, which are expected to occur about once every 10 years. With the extremely variable flows that a stormwater treatment facility would encounter, design and construction of a detention facility must be considered in order to retain and meter the volume of stormwater runoff through the treatment system. The detention facilities could result in unintended environmental impacts including vector issues and loss of water supply to the lakes due to evaporation and infiltration at temporary ponding facilities.

Additionally, the effectiveness of classic wastewater BMPs at treating phosphorus and nitrogen is expected to be much lower than wastewater texts would indicate. Concentrations of TN and TP in stormwater runoff are low compared to wastewater influent concentrations; thus, TN and TP reduction/removal from stormwater using conventional wastewater treatment technologies would be limited. For example, Stormwater Treatment, a recent book authored by Dr. Stephen Minton, indicates that the high removal efficiencies achieved by wastewater treatment technologies may be attributed to high influent concentrations of nutrients contained in wastewater. In essence, a stormwater treatment plant with lower influent concentrations would

have to be significantly larger than a wastewater treatment plant to achieve the same effluent concentration[2].

The cost to implement any of the aforementioned technologies is beyond local funding capabilities. Further, as the TMDL model has many uncertainties, including the fact that it has not been calibrated for wet conditions, municipalities cannot justify the cost and amount of land required to their Boards and constituencies. The following paragraphs address specific design issues and costs relative to constructed wetlands and other wastewater treatment technologies.

CONSTRUCTED WETLANDS

Constructed wetlands are biological treatment systems that have the potential to reduce TN and TP in stormwater. For the purposes of illustration, the estimated area required for a constructed wetland for removal of TP and TN from stormwater runoff was calculated for three flow rates recorded in the watershed. These calculations are based on equations presented in Stormwater Treatment[3]. The following table summarizes the preliminary design. It should be noted that the largest flow rate, 3,710 cfs, was the peak flow measured just upstream of Lake Elsinore during the 1998 wet season. This is one of the weakest wet seasons on record. The Perris Valley Channel, with a 91 square mile tributary area has recorded flow as high as 6,350 cfs and mainstream San Jacinto River flows could be expected to exceed 30,000 cfs. Please note that it is estimated that an expenditure of $94 million to acquire 3,620 acres of wetlands would be required to treat even a small flow rate of 10 cfs, or the flow rate that could be expected from a new development under a typical rain event, to the interim phosphorus target. The estimated costs only reflect the cost of land. Costs associated with design, construction and maintenance are not included in the cost estimates below. Note that the interim target (0.10 mg/L) was used for total phosphorus; total phosphorus proved to be the limiting factor and the design is based on the corresponding hydraulic loading rate that would achieve the concentration of 0.10 mg/L TP in the effluent stream. Further, there is no guarantee that this expenditure would result in the numeric target being achieved, as wetland removal rates are erratic at concentrations below 2 mg/L[4].

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[2] Minton, Gary R., Ph.D., P.E., 2002. Stormwater Treatment: Biological, Chemical, & Engineering Practices. Gary R. Minton. Seattle, WA. Page 282

[3] Minton, Gary R., Ph.D., P.E., 2002. Stormwater Treatment: Biological, Chemical, & Engineering Practices. Gary R. Minton. Seattle, WA.

[4] Minton, Gary R., Ph.D., P.E., 2002. Stormwater Treatment: Biological, Chemical, & Engineering Practices. Gary R. Minton. Seattle, WA. Page 282

Land Costs Associated with Constructed Wetlands for Three Different Flow Rates

	Total Nitrogen		Total Phosphorus			Land Cost[5]	
Q_o (cfs)	TN_o (mg/L)	TN_f (mg/L)[6]	TP_o (mg/L)	TP_f (mg/L)[7]	Wetlands Area (ac)	Low	High
10[8]	3.04	1.51	0.66	0.10	3,620	$ 18.1 M	$94.1 M
104[9]	2.02	1.51	0.53	0.10	27,264	$136.3 M	$708.8 M
3710[9]	4.20	1.51	1.07	0.10	3,236,045	$16.2 B	$84.1 B

The San Jacinto Nutrient Management Plan[10] also evaluated several urban BMPs, including wetlands and wet detention ponds. The report finds that while wetlands and wet detention ponds can reliably remove pollutants, their cost and applicability to most types of development were of poor to medium performance.

In summary, there are several concerns with implementing wetlands. Achieving removal efficiencies decreases during high runoff conditions unless the constructed wetland or wet detention pond is adequately sized to detain the large volume of storm runoff. Adequate sizing for the large volumes of stormwater runoff increases the amount of land area needed to safely detain and treat the incoming storm flow. Also, due to the arid climate in the San Jacinto watershed, maintenance of a wetland setting would require a continuous supply of supplemental water. EPA does not recommend the use of wetlands or wet ponds in semi-arid climates unless supplemental water is provided[11]. Dry detention basins were also considered, but Constructed wetlands and wet detention ponds have been proven to be more efficient in TN and TP removal compared to dry basins, which have no permanent wet pool.

Alternative Treatment Technologies

Alternative technologies that may be utilized for treatment of stormwater runoff are commonly used in advanced/tertiary wastewater treatment – sedimentation, precipitation, coagulation, and filtration unit processes. An engineered combination of these biological and physical/chemical technologies may be successful in effectively reducing phosphorus and nitrogen levels in stormwater runoff. However, designing the most effective combination of stormwater treatment technologies would require bench- and pilot-scale studies using actual stormwater runoff from within the watershed.

By varying the type of filter media and combining a series of systems or devices, filtration can be adapted for treatment of stormwater runoff. Media currently being used in stormwater treatment

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[5] Based on San Jacinto River planning estimates for right-of-way acquisition – $5000/ac to $26,000/ac.
[6] Based on equation from Minton, 2002 – A total nitrogen effluent concentration less than 1.5 mg/L yields a complex solution.
[7] Interim TMDL goal.
[8] Hydron Data for 1998 readings.
[9] USGS highest daily mean for February 24, 1998.
[10] Tetra-Tech, Inc. 2004. San Jacinto Nutrient Management Plan: Final Report. Report to Santa Ana Watershed Project Authority (SAWPA). San Diego, CA. (Table 4-9-1)
[11] http://cfpub.epa.gov/npdes/stormwater/menuofbmps/post_26.cfm

include amended sands, resins and zeolites; granular polymers (e.g., chitosan); peat; leaf compost; zeolites; and activated carbon. These media are currently most common in manufactured and proprietary stormwater treatment systems and inserts. These technologies are appropriate for application to individual facilities (e.g., an industrial site, commercial facility, portion of a residential development, etc.), but they are not feasible for stormwater runoff treatment at a watershed-level application. For example, the proposed improvements to the Lake Elsinore Treatment Facility to include filtration are proposed to cost $1.4 million and would treat upwards of 8 MGD. The peak runoff expected from Perris Valley Channel during the 1969 wet year exceeded 4,300 MGD. This would have require approximately 537 times the capacity of the existing Lake Elsinore Treatment Plant at an expenditure likely exceeding $1 billion. It should also be noted that the peak flow rate of the San Jacinto River at Cranston Bridge would be expected to exceed 43,870 MGD during an extreme wet year. Treatment of stormwater runoff at these levels of flow is not feasible. Further, the capacity of treatment plants designed for wet weather flows would lie dormant for many years between wet weather events. By inspection, these types of treatment technologies are not feasible for treatment of stormwater runoff to meet the TMDL targets. However, a brief description of these technologies follows.

Within the realm of filtration technology includes reverse osmosis (hyperfiltration) – a process where water is separated from dissolved salts in solution by filtering through a semipermeable membrane at a pressure greater than the osmotic pressure caused by the dissolved salts in [a] wastewater.[12] Reverse osmosis has the advantage of removing dissolved organics, including phosphorus, that are less selectively removed by other demineralization techniques. The advantages and disadvantages of reverse osmosis are summarized as follows:

Advantages

- Different membranes with capabilities to separate out an array of substances;
- Different substances are removed at varying efficiencies (nitrogen is removed at higher efficiency than phosphorus);
- New membrane technology (Vandal-ION™) with potential to reduce phosphorus to concentrations <10 ppb.

Disadvantages

- Produces brine water waste that requires disposal (approx. 15-25% of influent).
- Requires operating pressures of 150 – 400 psi.
- High energy costs.
- Membranes are relatively expensive.
- Costly maintenance and replacement of membranes contribute significantly to total treatment cost.
- Some compounds can make the membrane deteriorate or clog (e.g., sediment).
- Water pretreatment important: suspend and remove solid material, anti-scaling treatment, pH adjustment, dechlorination and softening.

Orange County Water District's (OCWD) Water Factory 21 (WF21) in Fountain Valley, CA, contains two parallel reverse osmosis (RO) systems capable of producing 5 MGD of treated (tertiary) wastewater for blending and recharge. The RO systems are only capable of reducing

[12] Metcalf & Eddy, Inc. 1991. Wastewater Engineering: Treatment, Disposal, Reuse. McGraw-Hill, Inc. U.S.A.

TN from 18.3 mg/L to 2.6 mg/L (TP data not provided).[13] The costs of this particular system are summarized below:

Capital & Construction Costs	$ 3 Million[14] ($10.5 Million in 2002 dollars)
Operating Costs @ Maximum Capacity (5 MGD)[15]	$312 / acre-foot

Note that influent into the RO systems is much higher than typical stormwater runoff TN levels – an average of 3 mg/L, as at the Perris-Nuevo and Elsinore Stations. As discussed earlier, elevated influent levels prove higher removal efficiencies in treatment technologies.

It should be noted that in 1980, approximately 167,000 acre-feet of flow entered Lake Elsinore. That volume of water is equivalent to the storage capacity of two Lake Elsinores under normal conditions. Providing either the flow treatment capacity (upwards of 4,400 MGD based on historical record, 9,355 MGD based on a 100 yr. design flow for the river at Railroad Canyon) or storage volume necessary to treat the water over time is not feasible. However, to illustrate the point, the cost presuming maximum treatment capacity of 4,400 MGD has been calculated.

Influent volume:	4,400 MGD
Volume treated (¥):	3,520 MG[16]
Brine Waste ¥:	880 MG
Time to treat:	1 day
Capital Cost:	$880 Million

Alternatively, the dischargers could opt to construct a 5-MGD treatment plant and storage capacity for 158,000 acre-feet (volume passing Railroad Canyon weir during 1980 storms). This would limit the capital cost to treat an extreme wet weather event to $10.5 million for the treatment plant, and between another $35 million to $182 million to purchase land area equivalent to two Lake Elsinores to store untreated water. This does not include the earthwork necessary to grade the land to store water to a depth of 25 feet. Further, it would take approximately four (4) years to treat that volume of water at 5 MGD.

The estimated cost of $84.2 million is for treatment of one wet-weather storm, and reflects energy requirements and labor. Note that this estimate does not include costs for filtration processes prior to RO treatment – filtration of influent is necessary to reduce the amount of sediment and suspended solids in influent streams. It does not reflect the design, construction and maintenance of detention/storage facilities, delivery systems, effluent distribution systems and brine waste discharge system/program.

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[13] http://www.ocwd.com/_assets/_pdfs/OCWDWF21.pdf

[14] Actual figure from mid-1970's.

[15] Operating costs include energy requirement and labor; does not include advanced water treatment (lime clarification, recarbonation, multi-media filtration and chlorination).

[16] Assuming 80% recovery in a treatment system similar to WF21.

The following table summarizes costs of two viable treatment technologies.

Technology	Capacity	Minimum Capital Cost
Constructed Wetlands	2394 MGD[17]	$ 16.2 Billion
Reverse Osmosis	4,400 MGD	$ 0.9 Billion

Conclusion

There are no feasible stormwater treatment technologies available to treat the volume of stormwater runoff to Canyon Lake and/or Lake Elsinore to meet the proposed TMDL targets. Prior to establishment of final TMDL targets, we recommend that the Regional Board review the total cost of available technology capable of achieving the proposed TMDLs, as mandated by Section 304(b)(1)(B) of the Clean Water Act. The District would further recommend that at a minimum, the Regional Board revise the interim and final target to be consistent with achievable nutrient concentrations based on the limits of current technology.

[17] 1 MGD = 1.55 cfs

NEED FOR ECONOMIC ANALYSIS

Neither the Federal Clean Water Act nor the California Water Code prohibits consideration of economic impact in issuing MS4 permits. On the contrary, it is incumbent upon all responsible public officials, whether elected or appointed, to consider the fiscal impacts of their decisions. The potential fiscal impacts of the proposed TMDL targets are real and significant, and should be fully identified and considered in the issuance of the TMDL.

The municipalities must be able to justify to their Boards and constituents that expenditures of public resources will result in real and significant benefits relative to completing societal needs. An economic analysis will further allow the municipalities to prepare budgets and funding requests for the management measures that will be necessary to improve the water quality of both lakes.

Los Angeles Trash TMDL Decision

The draft TMDL report specifically requires monitoring programs to be implemented. Further, the draft TMDL report proposes that the Regional Board adopt the TMDLs as an amendment to the Basin Plan. In the Statement of Decision for City of Arcadia *et al* v. The State Water Resources Control Board and The California Regional Water Quality Control Board, Los Angeles Region (2003), the Superior Court for the State of California, County of San Diego, ruled that the State and Regional Boards...

> "Under the applicable statutory scheme Basin Plans (1) identify beneficial uses of water bodies to be protected; (2) establish water quality objectives to protect those uses; and (3) establish implementation programs for achieving the objectives.
>
> As such, Respondents are incorrect in stating no water quality objectives are implemented. It may be true the Basin Plan was only amended to add the TMDL, but if the TMDL was originally part of the Basin Plan it necessarily would have made economic considerations under Section 13241. It is certainly reasonable to conclude that when amending the Basin Plan the same considerations should be made.[18]"

Thus, economic considerations must be analyzed under §13241 of the CWC in adopting a TMDL.

Federal Clean Water Act

Section 304 (b)(1)(B) of the Clean Water Act specifically states that in adopting or revising effluent limitations:

> "[Such regulations] shall include consideration of the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application, and shall also take into account the age of equipment and facilities involved,

[18] Statement of Decision. The City of Arcadia, et al versus The State Water Resources Control Board and the California Regional Water Quality Control Board, Los Angeles Region. Filed December 24, 2003. Page 13, Lines 11-18.

the process employed, the engineering aspects of the application of various types of control techniques, process changes, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate."

Estimated costs for sample analysis and labor for water quality monitoring are summarized in the following table. These costs are estimated at $344,000. Operation and maintenance of the stream flow gauges is an additional $258,600.

Water Quality Monitoring Program	Estimated Cost
Analysis – Watershed & Lakes	
Labor – Watershed	$172,068
Labor – Lakes	$57,342
Total Annual Cost - Analysis & Labor	**$344,370**
Gauge Station Annual O&M	$258,600
Total Annual Cost	**$602,970**
One-time Install of Remaining Gauges	**$126,000**

It is imperative that economic considerations be analyzed in adopting the TMDL. We have prepared cost estimates for stormwater runoff treatment (previously discussed) and for water quality monitoring. As Attachment A demonstrates, preliminary cost estimates on current treatment technologies prove to be cost prohibitive and are not feasible in the arid weather patterns of the watershed. Sizing a treatment technology to accommodate and treat runoff to the proposed TMDL goals will be an inefficient use of taxpayer money; the proposed TMDL goals are extremely low and implementing treatment mechanisms to achieve those goals requires unrealistic BMP sizing.

IMPLEMENTATION SCHEDULE

Attachment A to the draft TMDL report includes an implementation schedule with several tasks. Each of these tasks requires the preparation of a separate plan and/or monitoring reports, often within a short period of time after the adoption of the proposed TMDL. The implementation schedule must be modified to reflect the following:

1) There are several BMP measures that have either recently been proposed or are in process including several in-lake nutrient control projects, New Development guidelines from the MS4 NPDES Permittees, and other discharger efforts that are expected to reduce nutrient loads within the watershed.
2) The Implementation Schedule does not allow sufficient time for dischargers in the watershed to develop collaborative processes, including establishment of agreements for cost sharing; generation of joint Requests for Proposals/Qualifications from consultants who may be able to assist with development of plans, implementation of monitoring programs and development of models specified in the TMDL; or to provide time for consultants and/or dischargers to thoughtfully prepare the requested plans and monitoring programs.
3) The implementation schedule, by requiring immediate compliance with the proposed TMDL interim numeric targets (over a 10 year running average) would require the dischargers to spend public resources on implementation of nutrient control measures that, based on the Draft Report, would not provide water quality benefits.

We request that the proposed implementation schedule be modified to take the following considerations into account:

- Compliance with TMDL targets should be delayed until further study of the applicability of the numeric targets can be completed. This period of study should be sufficient to allow for a wet year to occur. This would likely be no less than 5 years from adoption date.

- It will take time to form the necessary discharger work groups, identify funding sources to prepare plans and participate in such a coordinated effort. Further the FY 2004-05 budget planning cycle has passed. Plan submittal dates should be respective of fiscal cycles. Some cities may also require additional time for the bid process to hire consultants.

- The effectiveness of the nutrient management measures currently being implemented for both lakes and throughout the watershed requires evaluation. It will take at least a couple of years to identify their impact on water quality within the lakes. It could be that these measures are more effective than anticipated.

- The required continuation of the existing monitoring program and selection of the nutrient management plan may impact locations and parameters of additional monitoring; it is prudent that the monitoring program be considered as part of the nutrient management plan. Further, the deadline for submittal of the nutrient monitoring plan

should consider the fiscal budgeting cycle and the necessary time for the dischargers to form a functioning work group that can address the proposed monitoring plan.

- The TMDL models are not adequately calibrated for wet conditions. The proposed targets may significantly change if a large storm occurs. The TMDL compliance period and numeric modeling adoption should be delayed to allow a wet year to occur.

These recommendations are made in addition to those presented in the cover letter.

RECOMMENDATIONS

The District recommends the following be considered as changes to the TMDL:

1. The text on page 75 describing Tables 7-1 through 7-4 should make it clear that there are separate discharger nutrient allocations for Lake Elsinore and Canyon Lake.

2. The TMDL should include a framework under which pollutant trading may occur. Questions that the framework should answer include:

   a. How long can credits be banked (recommend at least 10 years);
   b. Who tracks and determines credits available (recommend the Regional Board);
   c. What is the process by which pollutant trading occurs (recommend Regional Board establish policy); and
   d. What is the pollutant trading value of activities such as dredging the lakes?

   Alternatively, the Regional Board could require the dischargers to develop the aforementioned guidance as part of the Implementation Schedule.

3. The recommended interim and final numeric targets should be revised to be consistent with the irreducible concentration data presented earlier in this report. At a minimum, the in-lake concentration requirements should be raised to the same concentrations that the wastewater treatment plant operators are allowed to discharge (0.5 mg/L for Phosphorus, 1 mg/L for Nitrogen). Based on several of the conservative assumptions made in support of the TMDL, it may be possible to implement these changes without impairment of the Beneficial Uses.

4. Atmospheric deposition occurs throughout the watershed. The upstream dischargers do not have the ability to control the deposition in the watershed just as the lake owners cannot control the deposition onto the lake surfaces. There is not sufficient justification in the model to exempt atmospheric deposition onto the waterbodies and continue to require the dischargers in all other areas of the watershed to address atmospheric deposition in their WLA and LAs. We request that the total atmospheric deposition be calculated for the entire watershed, removed from the other land uses and include the load as a LA in the model.

5. Several important nutrient control projects shall be initiated within the next five years, including:

   a. The MS4 Permittees' Water Quality Management Plan for new development
   b. Implementation of new State mandated controls for septic systems
   c. Additional in-lake nutrient control projects

As an alternative to the immediate implementation of the interim numeric targets, the first five years of the TMDL could be used to determine the impact of these activities on the beneficial uses in the lakes. The following additional activities could also be completed during the first five-year period:

a. Form a Task Force to address the TMDL;
b. Propose and implement land-use based nutrient control pilot projects;
c. Revise and implement the in-lake and watershed-wide monitoring programs;
d. Develop and revise the lake and watershed models; and
e. Propose revised numeric targets for adoption by the Regional Board in 2009.

Allowing time to examine alternative nutrient control mechanisms, refine and update the models, and propose revised numeric targets will ensure that limited discharger resources are spent on activities that will effectively address the lake impairments. This will also allow the dischargers to assess the effectiveness of current nutrient management projects. Additional watershed controls to control external nutrient sources should only be implemented after in-lake controls have been successful in achieving their objectives.

6. The requirements of Task 5 are premature at this time:

- As of the current date, the State Water Resources Control Board has neither adopted nor even distributed the regulations required under California Water Code Sections 13290-13291.7. (AB 885 of 1999). AB 885 stipulated an effective date of January 1, 2004. The most recent draft distributed is over 1 year old, and systematic changes were described (...but not distributed) last December.

- The regulations indicated identify enforcement <u>by</u> the Regional Water Quality Control Boards, with a <u>presumption</u> that local agencies (i.e., the Department of Environmental Health) will assume responsibility through Memorandums of Understanding (MOUs). Given some of the more contentious elements within the regulations as discussed to date, and a probable significantly higher cost to the system owner, it is not a forgone conclusion that all local agencies <u>will</u> enter into such MOUs.

- Without said MOU it is not possible to implement Task 5.

The Riverside County Department of Environmental Health (DEH) has not been advised of the Regional Boards positions on entering into MOUs with the cities as well as the County.

It has come to the County's attention that at the April 19 TMDL meeting, testimony was given that the cities do not monitor/permit the septic systems within their cities, therefore the entire requirement may default to the County". Speaking to the Cities identified in Task 5, this statement implies that these activities are therefore conducted by the County. Both the statement and implication are incorrect and require clarification.

- City of Moreno Valley - The Riverside County DEH has a contract with the City of Moreno Valley to approve the design of septic systems. We do not issue the permit, we do not inspect the installation, we do not perform any "monitoring" of the systems and we do not investigate any system failures.

- City of Perris – The Riverside County DEH does not have a contract with the City of Perris related to septic systems. The County does not issue any permits, we do not inspect the installation, we do not perform any "monitoring" of the systems and we do not investigate any system failures.

- City of Murrieta – The Riverside County DEH has contracts with the City of Murrieta to approve the design of septic systems, inspect their installation and, upon request, investigate sewage discharges (which would include septic failures). The County does not issue the permit, nor does the County perform any "monitoring" of the systems.

The allocated timeframe of "6 months from the adoption of the effective date of this basin plan amendment" is inadequate. Due to the expected extensive changes to the current system, and related costs to the homeowners and businesses, the Board of Supervisors (and probably City legislators) will need to "approve in concept" the regulatory changes necessary for implementation. Our timetable is therefore: assimilate requirements, get on Board workshop schedule, have the workshop, and translate direction into a Plan.

Staff has been aware of the requirements of AB 885 since its introduction, and the requirements identified in Task 5 are not unexpected. However, the language of task 5, as written, require the County to: agree to enforce conditions without knowing what the conditions are, to entertain a MOU it may not want, and meet a schedule that is not realistic. Revised language for first paragraph:

> No later then (*6 months from the effective date of this basin plan amendment*), 12 months from the effective date of an agreement between the County and the Santa Ana Regional Board to implement regulations adopted by the State Water Resources Control Board pursuant to California Water Code Sections 13290-13291.7, the County of Riverside and the Cities of Perris, Moreno Valley, and Murrieta.... ...The Septic System Management Plan shall implement regulations adopted by the State Water Resources Control Board pursuant to California Water Code Sections 13290-13291.7.

Allowing time to examine alternative nutrient control mechanisms, refine and update the models, and propose revised numeric targets will ensure that limited discharger resources are spent on activities that will effectively address the lake impairments. This will also allow the dischargers to assess the effectiveness of current nutrient management projects. Additional watershed controls to control external nutrient sources should only be implemented after in-lake controls have been successful in achieving their objectives.

7. Tasks 8 and 9 of Appendix A should be revised to only name the entities owning the lakes. This would be consistent with recent positions taken by EPA, the State, and other Regional

Boards that indicate that owners of facilities are responsible for the pollutants that they accept into their facilities.

8. Adequate Water Quality Funding: 40 CFR 130.2(p) defines *Reasonable assurance.*

> "Reasonable assurance means a demonstration that TMDLs will be implemented through regulatory or voluntary actions, including management measures or other local controls, by federal, state, or local governments, authorized Tribes or individuals. Reasonable assurance for TMDLs established for nonpoint source pollution is addressed in 40 CFR 130.2(p)(2). 40 CFR 130.2(p)(2) requires a four-part test for nonpoint source pollution--the fourth part being that adequate water quality funding will support the TMDLs. 40 CFR 130.2(p)(2)(i) states in part, "Adequate water quality funding means that the State, Territory, or authorized Tribe has allocated existing water quality funds from any source to the implementation of the TMDL load allocations to the fullest extent practicable and in a manner consistent with the effective operation of its clean water program."

Local governments were specifically and conspicuously excluded from 40 CFR 130.2(p)(2)(i); therefore all costs of implementing any task in the Basin Plan Amendment associated with nonpoint source pollution should be funded by the State as required by the Clean Water Act. The document and Attachment A to the Resolution should be modified accordingly to show State of California responsibilities.

SPECIFIC COMMENTS: LAKE ELSINORE AND CANYON LAKE NUTRIENT TMDL REPORT

Pg. 6, 1st paragraph – Discussion should also include note that the lake occasionally goes dry, even before the levee was built.

Pg. 6, §2.2 – Discussion should acknowledge MSHCP will set aside vacant/open space land from being developed.

Pgs. 6, 7, and 8 – The cutoff channel around Mystic Lake carries little sediment because it has a low capacity. The bypass channel has not substantially changed the historic sediment inflow to Mystic Lake. Approximately every ten years on the average, there is enough rainfall in one year to produce flows in the San Jacinto River near Mystic Lake.

Pg. 17 Section 4.1.1 - During the reference state year of 2000-2001, Lake Elsinore had an average phosphorus concentration of .12 mg/L with no apparent algal blooms or fish kills and the lake was at an acceptable operational level. The use of the 25 percentile numeric target of 0.1 mg/L for the interim represents a direct 17% decrease in the waste load allocations for the watershed. While we recognize the need for a MOS, the 25% numeric target seems excessive.

Pg. 18, Table 4-2 – The Annual Average Total P should be reported in mg/L for direct comparison with the proposed numeric targets.

Pg. 20 – Is there conclusive data to back up the claim that the floodwaters of 1993 and 1995 "carried high nutrient loads from the San Jacinto watershed to Lake Elsinore"?

Pg. 23, §4.2.3 – As fish kills in Canyon Lake are based solely on anecdotal evidence, the first sentence should read: "Control of dissolved oxygen is important for Canyon Lake since the depletion of oxygen may have caused occasional fish kills, and has caused high nutrient flux rates...."

Pg. 47 – "...the LSPC model [developed by Tetra Tech] was never calibrated for the wet scenario". In fact, the model had very poor hydrologic calibration with the rainfall vs. runoff for the observed data that year. Since the proposed TMDLs are sensitive to these wet year calibrations, the TMDL numeric target implementation should be delayed until the wet year condition model can be calibrated.

Pg. 50 – In Table 5-10b there appears to be an error in the moderate year section where the TN load from Canyon Lake sediment is included in the Lake Elsinore totals but not the TP load.

Pg. 61, Equation 3 – TP target should be changed to C_{ss} to be consistent with the text that follows.

Pg. 66, first full paragraph – The last sentence states that "no reduction in the internal load of phosphorus for Canyon Lake" will be assumed as lake management studies have not been conducted. In wet years, approximately 40% of the phosphorus mass load to Lake Elsinore comes from Canyon Lake. As elimination of all inputs to Canyon Lake would not lead to a reduction of total phosphorus in the lake, loads leaving Canyon Lake in a wet year could lead to Lake Elsinore TMDL load targets not being met. This is a concern if enforcement action results when Lake Elsinore target loads are exceeded.

Pg. 82, paragraph before §11.A. – The potentially affected parties will be asked to evaluate the TMDL-related costs. Any information the Regional Board already has should be provided.

Pgs. 86 – Several dischargers have provided economic information for nutrient treatment management measures and water quality monitoring. This information should be summarized in Section 11 (Economic Considerations) and Table 13-1 (Nutrient Management Projects table).

Pg. 87, Item C. – Local tax funds are listed as a source of public financing by the local agencies. In November 1996, California voters approved Proposition 218 ("The Right To Vote On Taxes Initiative") amending Article XIII of the State Constitution[19]. Proposition 218 produced changes to some of the Permittees' historic funding sources and still looms as a potential threat to others. Additionally, with the current budget crisis in California and Riverside County, local agencies are being required to make across-the-board cuts in public programs, including police and fire protection and higher education.

Attachment A, Page 2, Item 1., 2nd paragraph – Fish kills in Canyon Lake based solely on anecdotal evidence (Report, pg. 23). The sentence should indicate so.

Attachment A, Page 10, 1st paragraph – Flexibility should be allowed to move or remove stations that are not providing useful information for the TMDL model or that present a risk to personnel during sampling events. Both the listing of stations and their sampling frequency are located in Table 5-9t.

Attachment A, Page 17, Task 6 – The Santa Ana Drainage Area Management Plan (DAMP) is currently being developed in a phased manner according to the time schedules in Board Order R8-2002-0011. The DAMP is to be submitted to the Executive Officer no later than January 1, 2005. Attachment A, Pages 18 and 19, Tasks 8 and 9 – The tasks require a proposed plan and schedule to evaluate in-lake sediment nutrient reduction and treatment as well as a monitoring program. The purpose of the monitoring program is to evaluate the effectiveness of the strategy that is implemented, and as such, the location of monitoring stations will necessarily come after the strategy is adopted. Establishing monitoring stations just for collecting "data" will not be a judicious use of public funds.

Attachment A, Pages 19 and 20, Tasks 10 and 11 – Nowhere in the task descriptions does it say that the Regional Board will assist in procuring funding. Regional Board staff's efforts to

[19] The Proposition 218 amendments require voter approval of any new taxes, fees, assessments, etc. In addition, certain existing taxes and assessments were subject to the Initiative's voter approval requirements. "Special taxes," as defined by the Initiative, require a 2/3rds majority while other types of assessments may only require a simple majority. In addition, voter approval is required to raise any existing special tax or assessment rates.

procure state and federal grant funding was vital to the success of the initial TMDL monitoring efforts, and the Permittees hope that these efforts will continue.

Attachment A, Pages 19 and 20, Tasks 11 & 12 – The review/revision of the Lake Elsinore/Canyon Lake Nutrient TMDL would need to be accomplished prior to the review and revision of water quality objectives. It is recommended these two tasks be switched so that Task 11 is the review/revision of nutrient TMDL and Task 12 is the review/revision of the water quality objectives.

Attachment B, Items I (Aesthetics) and IV (Biological Resources) – BMPs or treatment measures constructed to meet the interim and final TMDL targets could be aesthetically unpleasing due to large land requirements. Such lands may include those currently supporting riparian habitat or sensitive species. This needs to be acknowledged in the Environmental Checklist.

City of Lake Elsinore

"One City's Got More"

May 24, 2004

VIA MAIL AND FACSIMILE (909) 781-6288

Hope Smythe, Senior Environmental Scientist
Santa Ana Regional Water Quality Control Board
3737 Main Street, Suite-500
Riverside, CA 92501-3348

Re: Basin Plan Amendment to Incorporate Nutrient TMDL for Lake Elsinore

Dear Ms. Smythe:

Thank you for this opportunity to comment on an issue that is critical to the City of Lake Elsinore. Lake Elsinore is the largest natural freshwater lake in Southern California and is the namesake of our City. The quality of life for the citizens of Lake Elsinore is fundamentally dependent upon the quality and quantity of water in the Lake. Currently, Lake Elsinore does not meet the basic "fishable and swimmable" goals of the Federal Clean Water Act.

All natural lakes are a product of their watershed. Lake Elsinore's Watershed encompasses a diverse patchwork of frequently competing interests and the San Jacinto River flowing through the region is the thread that binds together our shared economic, recreational, public health and wildlife concerns. Nutrients dissolve in rainwater and are transported to Lake Elsinore via the San Jacinto River. The City of Lake Elsinore's jurisdiction covers less than five (5%) percent of the 760-square mile watershed, therefore we have limited authority to control the nutrient sources upstream that continue to pollute Lake Elsinore.

All the people who live, work and play in this watershed contribute to the immense and widespread nutrient pollution problem. Fairness compels all those who contribute to the problem to be part of the solution. Lake Elsinore will never be Lake Tahoe, but reasonably strict controls must be set in motion to prevent nuisance conditions and protect the many beneficial uses of the Lake. It is our hope that the SARWQCB will

remain engaged in this long-term challenge through adoption of this Phased Nutrient TMDL Program and steadfastly commit to the rehabilitation of Lake Elsinore.

Sincerely,

Dick Watenpaugh
City Manager

Cc: Mayor and City Council
Assistant City Manager
Director of Lake & Aquatic Resources

June 3, 2004
Re: Basin Plan Amendment to Incorporate Nutrient TMDL for Lake Elsinore
Comments by:

Pat Kilroy, Director
Lake & Aquatic Resources Department
City of Lake Elsinore

Overview:

The modeling for the Nutrient Source Assessment succeeded in consolidating all the known hydrologic, land use and water quality data within the San Jacinto River Watershed in a remarkable attempt to simulate the transport of nutrients to Canyon Lake and Lake Elsinore. However, this monumental effort was greatly hampered by the relevance of the historic data and by the nature of collecting water quality data in an arid watershed. Although the water quality record was incomplete and in some cases required practical assumptions, future monitoring and input into the evolving model will improve accuracy and should provide a valuable tool to help reduce nutrient pollution to the lakes.

For this Nutrient TMDL to succeed in a reasonable timeframe (15-years) it will require substantive changes in the production, protection and application of nutrients in the watershed. The Nutrient Source Assessment focused on the export of nutrients from multiple land uses, but failed to quantify the major sources of nutrients to the watershed itself. It is widely recognized by the scientific community that the best way to reduce non-point pollution is at the source. Reducing waste nutrient addition to the watershed itself, including dry years, will ultimately reduce the mass of nutrients transported to the lakes.

Conventionally phased TMDL Programs are based on adaptive management, where annual water quality monitoring allows timely adjustments to Wasteload Allocations (WLA) and Load Allocations (LA) allotted to point and non-point sources of pollution. Although this is the standard protocol for TMDL development when the data is incomplete, it is not practical for an arid watershed. The San Jacinto River Watershed is characterized by floods and droughts. Based on the historic hydrologic record, flow proportioned water quality monitoring over the entire SJR-Watershed will only occur at a frequency of one (1) time per six (6) years, which translates into three (3) samplings periods over 20-years. Furthermore, even during the rare wet year, the San Jacinto River only flows for three months. This infrequent monitoring is insufficient to fully implement the TMDL Program in a timely manner. Different environmental factors require a different approach.

Achievable Goal & Reasonable Pollution Control:

The attainment of the Nutrient TMDL Program's modest near-term goal for the algae biomass indicator (chlorophyll-a = 40 ug/L) in Lake Elsinore was nearly achieved during the year 2000-2001. Based on data collected by the Santa Regional Water Quality Control Board the mean chlorophyll-a value for that year was 52 ug/L. The monitoring year of 2000-2001 was preceded by 2-3 dry years with no inflow to the Lake. This demonstrates that in just a few years without nutrient pollution to the Lake it is possible to reduce algal levels low enough to approach the near-term goal. Implementing remediation measures such as lake stabilization, aeration and fishery enhancement will further reduce algal levels to achieve the algal biomass goal.

A large shallow lake that is the terminus of a large watershed and located in a sunny, arid region is ecologically hyper-sensitive to nutrient pollution. No one knows the natural trophic state of Lake Elsinore before European civilization began changing the San Jacinto River Watershed over 150 years ago. The results of an on-going sediment geochronology study may clarify when cultural eutrophication began to escalate. In the meantime, a glimpse of past water quality of the San Jacinto River may be found in the SARWQCB's current monitoring of the land use designation for Open Space/Forest. By no means should we consider this land to be the native condition, as logging and cattle ranching have occurred in this area, but it is the closest representative. The concentration of phosphorus measured in the San Jacinto River at the Cranston gauging station, near Idyllwild, is consistently below 0.1 mg/L. This concentration is 5-times lower than the phosphorus concentration that typically flows into Lake Elsinore. Hence, somewhere between the San Jacinto Mountains and Lake Elsinore the phosphorus pollution to the river increases 500%.

No Reasonable Assurance for Implementation in a Reasonable Period of Time:

The revised 10-Year running average for LA and WLAs is at odds with the SARWQCB's 5-Year schedule to consider revisions to the TMDL. Compliance with the Nutrient TMDL allocations should be the primary consideration for the 5-Year assessment by SARWQCB, but this is not possible when the compliance schedule is extended for 10-years. The 10-year running average allocation approach was proposed to account for the varied hydrologic conditions, but given the unpredictability of hydrology the next 10-years may not be representative either. The compliance and review schedules should coincide. Hydrologic conditions, nutrient concentrations and loadings from the San Jacinto River should be considered during the 5-Year assessment of the TMDL, with subsequent adjustments made based on the actual conditions over that period of time.

Recommendation: Set cumulative nutrient allocations at 5-Year running average to coincide with the SARWQCB's 5-Year schedule for considering revisions to the TMDL.

Gradual Reduction in Phosphorus Concentration & Loadings:

Based on the past 73 year hydrologic flow data the mean annual average volume of water that spills from Canyon Lake to Lake Elsinore is approximately 7,000 acre-feet. A realistic approach to attain the TMDL goals would require a gradual reduction in the nutrient loadings from the San Jacinto River to Lake Elsinore.

So too, recent analysis by CH2M-Hill and the University of Riverside indicates that the volume of the local annual stormwater runoff is approximately 2,000 acre-feet. The phosphorus Waste Load Allocation for local urban runoff to Lake Elsinore is only 124 kg/year. Therefore, the urban stakeholders would be required to lower Total Phosphorus concentrations in the stormwater to 0.05 mg/L to meet the TMDL compliance by 2015. This concentration of TP is too low to be met in a reasonable timeframe and much more restrictive than upstream stakeholders.

Recommendation: Revise WLAs & LAs based upon using an approach similar to the spreadsheets below.

WLA & LAs from Canyon Lake Watershed to Lake Elsinore:

Year	Canyon Lake Spills Volume (AF/Yr)	Total Phosphorus (mg/L)	Total Phosphorus (Kg/Yr)
2005	7,000	0.45	3,893
2006	7,000	0.40	3,461
2007	7,000	0.35	3,028
2008	7,000	0.30	2,596
2009	7,000	0.25	2,163
5-Year Average	**35,000**	**0.35**	**15,141**
2010	7,000	0.22	1,903
2011	7,000	0.20	1,730
2012	7,000	0.18	1,557
2013	7,000	0.16	1,384
2014	7,000	0.14	1,211
5-Year Average	**35,000**	**0.18**	**7,787**
2015	7,000	0.10	865
2016	7,000	0.09	779
2017	7,000	0.08	692
2018	7,000	0.07	606
2019	7,000	0.06	519
5-Year Average	**35,000**	**0.08**	**3,461**
2020	7,000	0.05	433

Local Urban Stormwater Runoff WLA to Lake Elsinore:

Year	Local Stormwater Volume (AF/Yr)	Total Phosphorus (mg/L)	Total Phosphorus (Kg/Yr)
2005	2,000	0.45	1,112
2006	2,000	0.4	989
2007	2,000	0.35	865
2008	2,000	0.3	742
2009	2,000	0.25	618
5-Year Average	**10,000**	**0.35**	**4,326**
2010	2,000	0.22	544
2011	2,000	0.2	494
2012	2,000	0.18	445
2013	2,000	0.16	396
2014	2,000	0.14	346
5-Year Average	**10,000**	**0.18**	**2,225**
2015	2,000	0.1	247
2016	2,000	0.09	222
2017	2,000	0.08	198
2018	2,000	0.07	173
2019	2,000	0.06	148
5-Year Average	**10,000**	**0.08**	**989**
2020	2,000	0.05	124

Develop Timely Monitoring, Source-tracking, Accountability and Compliance Procedures:

For the TMDL Program to succeed it must link phosphorus pollution to land use, then to an individual, agency or organization that is accountable for making the needed corrections. The current monitoring plan formulated under the Nutrient Source Assessment does not achieve this objective. There are only eighteen flow-proportioned sampling stations throughout the 760-square mile San Jacinto River Watershed. It's implausible that these few stations can quantify the phosphorus loadings from multiple land uses followed by an assessment of load allocations to responsible parties.

Assessment of load allocations from such few flow proportioned sampling stations is compounded by the collection of samples in an arid watershed. Based on the historic hydrologic record, flow proportioned water quality monitoring may only occur at a frequency of one (1) time per six (6) years, which translates into three (3) samplings periods over 20-years. Furthermore, even during the rare wet year, the San Jacinto River only flows from the mountains to the lakes for three months.

Flow proportioned sampling stations have an estimated capital cost of $15,000; more importantly, the annual Operating Cost is another $15,000. The high flow volume required to collect meaningful data from these stations is too infrequent. Furthermore, it's difficult or almost impossible to link the data from the stations to a responsible party to effect a change in land use practices.

Phosphorus Load Allocations (LAs) and Waste Load Allocations (WLAs) are calculated by multiplying the water flow volume by the phosphorus concentration (mg/L). There is nothing inherently polluting from the volume of water flowing to the lakes. In contrast, the concentration of a pollutant contained in the flowing water fundamentally determines the mass of pollutant transported.

The SARWQCB has no reason to limit the volume of flow from the San Jacinto River. If phosphorus LAs & WLAs are established under moderate flow volumes, then at high flow volumes either the phosphorus concentration must be lowered or an increase in the allocations must be permitted to meet the requirements. If allocations are adjusted for flow volume, then the TMDL is just a concentration based program.

A single flow proportioned sampling station for monitoring a large area with multiple and ever changing land uses over the 20-year TMDL program may prove to be unfair to some stakeholders. For instance, an agricultural stakeholder may implement sufficient control measures to reduce nutrient pollution from their property, but be held in violation of the TMDL load allocation based on the failure of the urban stakeholders. A maximum threshold nutrient concentration would ensure all stakeholders are meeting some minimum requirement to reduce nutrient pollution.

Recommendation: Develop a secondary phosphorus concentration threshold of 0.5 mg/L for flowing water in all tributaries to the San Jacinto River to facilitate pollutant source-tracking, timely "cause & effect" compliance, equity and reduced sampling costs.

Concentrate Efforts on Phosphorus Reduction:

The San Jacinto Nutrient Management Plan imperfectly lumps together nutrients (nitrogen & phosphorus) as the cause of impairment to the waterbodies. This may inadvertently misdirect limited resources to control nitrogen, when phosphorus is the major problem. I believe nitrogen fixing by cyanobacteria will prevent any meaningfully reduction of nitrogen to the lakes sufficient enough to limit algal growth. Nitrogen is a transient element with the majority of nitrogen addition to Lake Elsinore coming from the atmosphere and losses through volatilization of ammonia and denitrification. In contrast, phosphorus is a conservative element that is only added to the Lake through inflows. Once phosphorus is added to the Lake it persists in the aquatic environment to fuel future algal growth for decades past the time of the original addition.

Water quality indicators, bioassays and nutrient studies demonstrate that phosphorus is the primary limiting agent for algal growth in Lake Elsinore. For example, the concentration ratio of nitrogen to phosphorus is greater than 15:1, which indicates phosphorus is limiting. Bioassays with separate spiked additions for nitrogen and phosphorus only showed algal growth under phosphorus addition (Anderson 2000). It can be deducted from nutrient studies conducted following a prolonged dry period, with no inflows, that nearly all the nitrogen added to the Lake is generated internally through nitrogen fixing blue-green algae.

I don't believe any case studies exist to prove that a substantial reduction in nitrogen loadings alone in a watershed, without phosphorus reduction, is feasible to reverse the similar eutrophic conditions faced by Canyon Lake and Lake Elsinore.

The best way to control nitrogen input to Lake Elsinore is to limit phosphorus. A reduction in phosphorus will reduce the biomass of nitrogen fixing cyanobacteria, which, in turn, will reduce the major source of nitrogen to the Lake.

Recommendation: Establish a total ammonia water quality standard for the San Jacinto River. Raise the total nitrogen target based on the high end guidance ratio for TN:TP of 15:1 or completely eliminate the TN target, then adjust or eliminate TN allocations for Lake Elsinore.

Immediately Implement Reasonable Nutrient Reductions Measures

The TMDL Implementation Plan should make concrete recommendations for changing land use practices in the watershed and a timetable for compliance. The whole purpose of implementing a TMDL program, with water quality based standards, is due to the failure of technology based (BMPs) standards to protect Lake Elsinore over the past 25-years. Below are a few examples of the problems.

The SARWQCB conducted an extensive study on dairy manure entitled "Dairies and Their Relationship to Water Quality Problems in the Chino Basin" (July-1990). According to this report the SARWQCB currently limits manure spreading to croplands to 12-tons/acre/year based on agronomic application rates for nitrogen. This total nitrogen application rate meets the nitrogen requirement for the types of crops produced in the region. However, dairy manure contains a disproportionate amount of phosphorus per unit of nitrogen. Approximately 400-pounds of nitrogen

and 244-pounds of phosphorus are contained in 12-tons of dairy manure. This results in nitrogen to phosphorus ratio of 1.6:1. In contrast, plants require approximately 8-times more nitrogen than phosphorus. Therefore, the spreading of 12-tons of manure per acre on cropland to meet the nitrogen requirement for plants, results in an excess application of phosphorus by over 400%.

The 2002 ANNUAL REPORT OF ANIMAL WASTE DISCHARGE by the Santa Ana Regional Water Quality Control Board shows that the annual disposal of dairy manure to the San Jacinto River Watershed equates to 237,887 tons of local production and another 417,636 tons imported from the Chino Basin. The maximum amount of manure permitted by the SARWQCB's Waste Discharge Requirements equals 12-tons per acre per year, therefore the total amount (655, 523 tons) of manure generated or imported to the watershed must be spread on 54,627 acres. Each ton of manure contains approximately 20.3-pounds of phosphorus, which equates to a total of 13,307,117-pounds of phosphorus per year added to the San Jacinto River Watershed. It is apparent from these staggering figures that the improper use of dairy manure can substantially impact surface water quality.

Soil testing should be required prior to the application of manure to cropland to assess the current availability of phosphorus in the soil. For instance, according to the USDA if soil testing shows phosphorus levels exceeding 150 ppm TP, then no phosphorus needs to be applied with the exception of a maximum of 20-lbs/acre of starter P_2O_5 for certain row crops.

The current "Basin Plan" recognizes that non-point source pollution represents the greatest threat to surface water quality. In the past, the SARWQCB has had limited authority and wherewithal to control non-point sources of pollution from agricultural lands. However, dairy manure is generated from a point source, thus the use of manure can be and is regulated through "waste discharge requirements". The SARWQB should take this opportunity, when developing the TMDL Program, to revise the definition of "agronomic" application rates for dairy manure spreading to be based on the primary element (phosphorus) impairing the beneficial use of water within the drainage area.

The TMDL Implementation Plan does include a voluntary development and implementation of a Nutrient Management Plan by agriculture. The NMP would require a study of agronomic application rates for guidance in fertilizer and manure application; however funding of the study and a timetable for implementation is lacking. Most of this data already exists and should be gleaned from the scientific literature, then implemented. The burden of proof to increase the application of nutrients above existing USDA guidelines should fall on the Stakeholders.

Recommendation: Require soil testing and agronomic manure application rates for the "pollutant of concern" (phosphorus) based on existing U.S. Department of Agriculture guidelines. Implementation of Nutrient Management Plans by Agriculture should be mandatory, not voluntary.

Reclaimed water is an important resource that must be used wisely to support all the beneficial uses of water in the watershed. Use of reclaimed water in the SJR Watershed includes irrigation of golf courses, nurseries, municipal streetscapes & farmland, as well as enhancement of wetlands & duck ponds. These multiple uses of reclaimed water provide a significant benefit to supplement the region's water supply.

The production and use of reclaimed water throughout the San Jacinto River Watershed should not be counterproductive to the Nutrient TMDL Program. Under the current NPDES Permits for the Publicly Owned Treatment Works within the Watershed, there are no quantifiable limits or minimum technology based standards for the amount of phosphorus contained in reclaimed water.

Approximately 35,000 acre-feet of reclaimed water is annually distributed to multiple land uses within the San Jacinto River Watershed. This translates into about 190,000 pounds of phosphorus (2.0 ppm TP) distributed throughout the SJR Watershed each year. Although some phosphorus is removed by irrigation of golf courses, nurseries, municipal streetscapes, farmland, wetlands & duck ponds; there is little quantifiable removal of the phosphorus pollution contained in the reclaimed water. Even if these multiple uses have some phosphorus removal capability, none of them should be considered a substitute for proper wastewater treatment.

End users of reclaimed water purchase this product for the water, not the nutrients. For consistency, the Nutrient TMDL Program should require all Publicly Owned Treatment Works selling reclaimed water in the San Jacinto River Watershed to meet the minimum standard for treatment of the pollutant that is impairing the local water-bodies prior to the sale and distribution of reclaimed water from their facilities.

No other chemical parameter regulated by Waste Discharge Requirements allow for the removal of pollutants by the end user. For example, when reclaimed water or biosolids are applied to land, no removal credits are allowed for pathogens (coliform bacteria indicator), heavy metals, nitrogen, pH or settleable solids. Why would the SARWQCB allow a lower standard for phosphorus pollution upstream of a waterbody impaired by phosphorus?

Public agencies, such as Publicly Owned Treatment Works, are a reflection of society as a whole and should set an example for other industries to follow. POTWs should meet the minimum standard for treatment of a pollutant that is impairing the local waterbody prior to discharge of reclaimed water off-site of their facility. Therefore, the Santa Ana Regional Water Quality Control Board should require all reclaimed water utilized in the Lake Elsinore/San Jacinto River Watershed to meet the minimum standard of best available technology (BAT) economically achievable for the removal of nutrients.

Recommendation: Revise waste discharge requirements for the use of reclaimed water in the Lake Elsinore/San Jacinto River Watershed to meet the minimum treatment standard of best available technology (BAT) economically achievable for the removal of nutrients.

Water Quality focus for all Pollutant Trading:

All pollutant trading should be based upon scientifically defensible improvements to water quality. Not all pollutant trading is equal. For example, soluble (reactive) ortho-phosphorus is bio-available to algae for immediate uptake and assimilation; where as a substantial fraction of particulate phosphorus is not bio-available to algae. Seemingly equal loadings of SRP versus Particulate-P would result in substantially different affects on water quality.

Additionally, nutrient loadings are not the sole determiner of water quality in Lake Elsinore. The quantity of water in the Lake substantially affects water quality. Lake Elsinore's high phosphorus internal load can be partially mitigated by the addition of a sufficient quantity of water.

Recommendation: All Pollutant Trading proposals shall be considered and approved by the SARWQCB based upon scientifically defensible improvements to water quality that conform to the attainment of the algal biomass and dissolved oxygen response indicators for the interim and final TMDL.

Supplemental water WLA is unrelated to LA for agriculture:

It should be stated in the Nutrient TMDL Program that there is no relationship between the Waste Load Allocation for supplemental water and the limited Load Allocation for agriculture. Based on the unusual hydrologic condition of the SJR-Watershed, the supplemental water will only be added in years with low inflow from the San Jacinto River Watershed.

TNRCC

Adopted by TNRCC: February 2001
Approved by EPA: December 2001

Two Total Maximum Daily Loads for Phosphorus in the North Bosque River

For Segments 1226 and 1255

Prepared by:
The Strategic Assessment Division, TNRCC

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recycled paper

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

United States
Department of
Agriculture

Natural
Resources
Conservation
Service

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Research
Service

Manure Nutrients Relative to the Capacity of Cropland and Pastureland to Assimilate Nutrients:

Spatial and Temporal Trends for the United States

Robert L. Kellogg, Ph.D.
Natural Resources Conservation Service
Washington, DC

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Natural Resources Conservation Service
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Economic Research Service
Washington, DC

(The assimilative capacity parameters used for cropland used as pasture are based on the assumption that the land was frequently rotated with cropland. In the census, however, some of the land designated as *cropland used as pasture* is rarely used as cropland. Where this is the case, the assimilative capacity has been overstated. Using the per acre assimilative capacity assumptions for permanent pastureland (28 pounds per acre for nitrogen and 11 pounds per acre for phosphorus) to represent per acre assimilative capacity for cropland used as pasture, estimates of total assimilative capacity were 7 percent lower for nitrogen and 19 percent lower for phosphorus nationally. In some areas of the country (Hawaii, West Virginia, Oklahoma, Texas, and Alabama), total assimilative capacity estimates were as much as 25 percent lower for nitrogen and 35 percent lower for phosphorus.)

Table 9 Nutrient uptake parameters for 24 crops used to estimate assimilative capacity of cropland

Crop	Yield unit	-- Pounds of nutrients per yield unit -- Nitrogen	Phosphorus	-- Pounds of nutrients per ton of product -- Nitrogen	Phosphorus
Corn for grain	bushels	0.80	0.15	28.57	5.36
Corn for silage	tons	7.09	1.05	7.09	1.05
Soybeans	bushels	3.55	0.36	118.33	12.00
Sorghum for grain	bushels	0.98	0.18	35.00	6.43
Sorghum for silage	tons	14.76	2.44	14.76	2.44
Cotton (lint and seed)	bales	15.19	1.89	60.76	7.56
Barley	bushels	0.90	0.18	37.50	7.50
Winter wheat	bushels	1.02	0.20	34.00	6.67
Durum wheat	bushels	1.29	0.22	43.00	7.33
Other spring wheat	bushels	1.39	0.23	46.33	7.67
Oats	bushels	0.59	0.11	36.88	6.88
Rye for grain	bushels	1.07	0.18	38.21	6.43
Rice	bags	1.25	0.29	25.00	5.80
Peanuts for nuts (with pods)	pounds	0.040	0.003	80.00	6.00
Sugar beets for sugar	tons	4.76	0.94	4.76	0.94
Tobacco					
IN, MO, OH, and WV	pounds	0.0298	0.0024	59.60	4.80
KY	pounds	0.0299	0.0024	59.80	4.80
NC	pounds	0.0329	0.0020	65.80	4.00
TN	pounds	0.0302	0.0023	60.40	4.60
VA	pounds	0.0322	0.0021	64.40	4.20
all other states	pounds	0.0330	0.0020	66.00	4.00
Potatoes	bags	0.36	0.06	7.20	1.20
Sweet potatoes	bushels	0.13	0.02	5.20	0.80
Alfalfa hay	tons	50.40	4.72	50.40	4.72
Small grain hay	tons	25.60	4.48	25.60	4.48
Other tame hay	tons	19.80	15.30	19.80	15.30
Wild hay	tons	19.80	15.30	19.80	15.30
Grass silage	tons	13.60	1.60	13.60	1.60
Sorghum hay	tons	2.39	1.01	2.39	1.01

Note: Values in this table are the same as those previously published by Lander, Moffitt, and Alt (1998).

Elsinore Valley Municipal Water District

June 3, 2004

California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3348

Attention: Xinyu (Cindy) Li, Ph.D.

Dear Ms. Li:

We appreciate the opportunity to comment on the TMDL draft reports of March 26, 2004 and revised May 21, 2004. Elsinore Valley Municipal Water District has reviewed the report with expert input from Dr. Alex Horne, Ph.D. Professor Emeritus UC Berkeley. This review points to a number of issues that are not addressed in the traditional approach used in this study. In fact because of Lake Elsinore's unique status, we believe the traditional approach does not adequately portray the necessary requirements or the physical conditions needing to be addressed to establish TMDL.

Lake Elsinore is unique because it is and always will be a eutrophic lake. Lake Elsinore is unique because it is an ephemeral lake subject to extreme fluctuation in water supply as experienced in the desert climate of southern California. Because this is a eutrophic ephemeral lake, it is subject to an extreme variation in loading, whether it be from external derived nutrients or internal loading from thousands of years of watershed settlement deposition. This large variance can not be controlled by traditional best practices or treatment technologies; and, therefore, requires a different analysis which is outlined in our expert review. The District requests that the Regional Board continue its TMDL hearings and not schedule any action until our expert analysis is fully reviewed and presented.

The TMDL should include a more realistic appraisal of the lake's potential for beneficial use such as the overriding need for a stable water level to reduce fish kills and algae blooms. The TMDL process is designed to restore polluted lakes to their original state by reducing nutrient inputs to levels that restore historical water quality or at least some level above historical. The draft document recognizes that the TMDL process has difficulty in trying to reverse eutrophication in Lake Elsinore since it is a shallow naturally eutrophic lake with a large watershed. Unlike most lakes, the role of nutrients and thus TMDLs in Lake Elsinore are subordinate to lake level or the climate. Because of their minimal impact, it is unlikely that the TMDLs as proposed will bring any

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noticeable increase in beneficial use. However, the lake can be improved without the traditional imposition of more restrictive TMDL values.

Other than a stable lake level target, the only other target needed is that the dissolved oxygen (DO) standard should be raised to 5 mg/L throughout the water column. High bottom water DO is needed to attain the already agreed upon N and P offsets for import of reclaimed water. High benthic DO is also needed to reduce fish kills and reduce the release of toxic ammonia. The N, P and chlorophyll-a standards are unrealistically low for a lake with such a high ratio of watershed to lake surface area. The current numerical TMDL targets for Lake Elsinore do not provide acceptable water clarity or protection from fish kills or algal blooms. A higher standard for DO throughout the water column seems to be all that is required to protect beneficial uses at present. The method by which the DO is attained in perhaps best left to others than the Regional Board in the same way that the BOD in wastewater effluent is set by the board but the method of achievement is left to the treatment plant owners.

The lake model seems to indicate that an increase of water level will be more beneficial than implementation of watershed TMDLs and conversely, that a reduction in water levels will overwhelm any benefits from TMDLs. The issue of a stable and high lake level, which exceeds water quality in importance, is not addressed adequately in the beneficial use impairment sections. Admittedly, lake level versus water quality has not been a part of most TMDL considerations but Lake Elsinore is unique in this respect and the improvement in beneficial uses can be achieved by other methods, primarily by lake management. (The potential methods were given in the 2002 EVMWD NPDES feasibility study).

Good water clarity (>2 m Secchi depth) is only achievable with biomanipulation that requires a relatively stable water level. The draft TMDL document will provide only ~ 0.5 to 1 m Secchi depth even if the TMDL targets are reached. A Secchi depth of 0.5 to 1 m is not an acceptable value for public water contact recreation. Finally the controversial lake level versus fish kill relationship (or lack of same) should be addressed in a more balanced way.

Elsinore Valley Municipal Water District makes the following technical recommendations:

1. The minimum dissolved oxygen target of 5mg/L be set for all water depths.
2. A target water level of 1246 +/- 1.0 ft msl be set as a long-term numerical TMDL target. This corresponds to a limnologically more meaningful 26 feet maximum water depth.
3. Biomanipulation and long-term in-lake TMDL management targets (methods) be set in place of numerical N,P, chlorophyll or Secchi target (concentrations).

4. No target for in-lake nutrients (nitrogen and phosphorus) be set with exception of the Health Department rule of less than 10 mg/L as N for Canyon Lake (for drinking water source protection).
5. Nitrogen be defined as biologically available Total Inorganic Nitrogen (TIN) not Total Nitrogen (TIN + biologically unavailable organic-N) in lake targets and lake models.
6. Phosphorus be defined as either 80% Total Phosphorus (TP) or biologically available TP (most forms of P except apatite, calcium phosphate).
7. The lake level versus fish kill section be reconsidered in the light of the lake model now available and with consideration of other opinions.

In summary, we are very interested in a balanced TMDL that has a reasonable level of success built in. There is substantial doubt that the traditional end-of-pipe concentration standards being proposed for nitrogen and phosphorus can achieve that success. These traditional solutions require an enormous commitment of capital funds that are not available in the foreseeable future despite the efforts of LESJWA to proceed with Prop 13 funding and other approaches. Setting a standard which guarantees noncompliance and does not improve the beneficial use of Lake Elsinore for fishing and recreational activities would be counterproductive.

Please contact the undersigned to schedule a meeting at our mutual convenience for a more detailed explanation.

Sincerely,

Ronald E. Young P.E., DEE
General Manager

DRAFT – DRAFT - DRAFT

Memo to: Phil Miller, Elsinore Valley Muncipal Water District (EVMWD)
From: Alex Horne, Ph. D. Professor Emeritus UC Berkeley and lake consultant to EVMWD
Re: Review of the California Regional Board Water Quality Control Board (Santa Ana Region): Lake Elsinore & Canyon Lake Nutrient Total Maximum Daily Loads dated 26 March 2004 prepared by Xinyu "Cindy" Li Ph. D.
Date: 24 May 2004

SUMMARY

The Draft TMDL proposal has some excellent points and attempts to solve a difficult situation in morphometrically eutrophic Lake Elsinore. However, several factors about the current lake are unique and artificial causing the management for maximum public benefit to conflict with some recommendations made in the TMDL. The draft TMDL could be improved in several ways. These primarily include a more realistic appraisal of the lake's potential for beneficial uses, recognition of the overriding need for a stable water level and reduction in fish kills and malodor. The TMDL process is designed to restore polluted lakes to their original state by reducing nutrient inputs to levels that restore historical water quality or at least some level above historical that is tolerable. The draft TMDL recognizes that the TMDL process has difficulty in trying to reverse eutrophication in Lake Elsinore since it is a shallow naturally eutrophic lake with a large watershed. Unlike most lakes, the role of nutrients (and thus TMDLs) in Lake Elsinore are subordinate to lake level or the climate. Because of their minimal impact, it is unlikely that the TMDLs as proposed will bring any noticeable reduction in beneficial use. However, the lake can be improved, just not in the tradition way of imposing more restrictive TMDL values.

Of the targets needed other than a stable lake level the only one needed is that the dissolved oxygen (DO). The DO standard should be raised to 5 mg/L throughout the water column, not just at the top. High bottom water DO is needed to attain the already agreed upon N and P offsets for import of reclaimed water. High benthic DO is also needed to prevent fish kills and the release of toxic ammonia. The N, P and chlorophyll *a* standards are unrealistically low for a lake with such a high ratio of watershed: lake surface area, especially since the lake has been deliberately reduced in size by 50%. These three targets are not helpful. The current numerical TMDL targets for Lake Elsinore do not provide acceptable water clarity or protection from fish kills or malodor. More stringent TMDL targets are simply not attainable. A standard for DO throughout the water column seems to be all that is required to protect beneficial uses at present. The method by which the DO is attained in perhaps best left to others than the Regional Board in the same way that the BOD in wastewater effluent is set by the board but the method of achievement is left to the treatment plant owners. The lake model indicates that an increase of water level will do more than any watershed TMDLs and conversely that a reduction in water levels will overwhelm any TMDLs. In numerical targets are set for

N, the use of the TN as a numerical target should be avoided since TN in Lake Elsinore is dominated by biologically inert organic-N. The use of biologically available TIN (Total Inorganic Nitrogen = ammonia + nitrate) is suggested to replace TN. The use of TIN would change the T:P ratios and potential BMPs in the watershed.

The issue of a stable and high lake level, which exceeds water quality in importance, is not addressed adequately in the beneficial use impairment sections. Admittedly, lake level versus water quality has not been a part of most TMDL considerations but Lake Elsinore is unique in this respect. However, the existing beneficial uses can be achieved by other methods, primarily by lake management. The potential methods were given in the 2002 EVMWD NPDES permit application). Most importantly good water clarity (> 2 m Secchi depth) is only achievable with biomanipulation that requires a relatively stable water level. The draft TMDL document will provide only ~ 0.5 to 1 m Secchi depth even if the TMDL targets are reached. A Secchi depth of 0.5 to 1 m is not an acceptable value for public water contact recreation. Finally, the controversial lake level versus fish kill relationship (or lack of same) should be addressed in a more balanced way.

RECOMMENDATIONS (in order of priority)

1. The minimum dissolved oxygen target of 5 mg/L be set for all water depths
2. A target water level of 1246 +/- 1.0 ft amsl be set as a long-term numerical TMDL target. This corresponds to a limnologically more meaningful 26 feet maximum water depth.
3. Biomanipulation and long-term in-lake TMDL management targets (methods) be set in place of numerical N, P, chlorophyll or Secchi targets (concentrations).
4. No target for in-lake nutrients (nitrogen and phosphorus) be set with the exception of the Health Department rule of less than 10 mg/L as N for Canyon Lake (for drinking water source protection).
5. Nitrogen be defined as biologically available Total Inorganic Nitrogen (TIN) not Total Nitrogen (TIN + biologically unavailable organic-N) in lake targets and lake models.
6. Phosphorus be defined as either 80% Total Phosphorus (TP) or biologically available TP (most forms of P except apatite, calcium phosphate).
7. The lake level versus fish kill section be reconsidered in the light of the lake model now available and with consideration of other opinions.

REVIEW OF THE DRAFT TMDL

OVERALL

The problems of Lake Elsinore include both conventional and rather unique elements. In addition, the lake has not been well studied over many years in the way that many other lakes have been examined. Thus the TMDL has to extrapolate in some areas and make suggestions based on little data in others. These limitations are admitted in the draft TMDL. Although the extrapolations are often correct, in some areas they are

questionable. This review discussed some of the questionable extrapolations and suggests alternatives.

Lack of lake water elevation (minimum water depth) and small variation in water depth as prime targets for the TMDLs

It has not been customary for TMDLs to consider water depth as a prime numerical target. This is because most lakes have a small variation in depth over the season and over decades. Lake Elsinore is an outlier in this respect and naturally dried out every generation or so. The draft TMDL shows that in-lake nutrient concentrations vary dramatically as the lake level rises and falls with the natural drought cycles of the semi-arid southwest USA. Even with almost no inflow (ideal zero daily loads) the water quality falls. Thus the traditional TMDLs in the watershed play a small role in the beneficial uses of the lake.

The draft TMDL report should be recast to consider the reality of the role of water level in the lake. While no one wants large amounts of nutrients to be delivered to Lake Elsinore, there is no good way to provide beneficial use attainment without a higher and stable water level. Thus conventional TMDLs are simply not appropriate at this stage. When the lake water level is stabilized at say the agreed upon "desirable depth of 25 feet (1246 =/- 1.0 ft aml) the water quality will improve so much that the current TMDL targets will either be met automatically or can be set in a meaningful way.

Thus the long-term TMDL targets should be focused on reaching the desirable water level and maintaining very small seasonal water elevation variations. Once this occurs biomanipulation will occur with or without any help from TMDLs and lake clarity will improve, algae decline and the in-lake TMDL targets may indeed be reached or exceeded. Without a stable water level the TMDL targets will probably never be reached in a consistent fashion. The current numerical targets for Lake Elsinore do not provide any really acceptable water clarity or protection from fish kills or malodor.

NUMERIC TARGETS: ALTERNATE SUGGESTIONS TO THE AMOUNTS AND DEFINITIONS USED IN THE TMDL

Dissolved oxygen.

The target DO for the deeper water in Lake Elsinore and Canyon Lake (table 401 in the draft report) is too low to achieve beneficial uses. It is set at 2 mg/L for a depth of 1 meter from the sediments. This target is not protective of the beneficial uses for two reasons.

- Bottom water DO of 2 mg/L fails to provide sufficient oxidizing power to ensure that the N and P will not be released from the sediments. Typically a DO of 2 mg/L one meter from the sediments means that the sediments themselves will be anoxic and release phosphate and toxic ammonia. The releases called internal loading in eutrophic lakes usually exceed the external loadings. Unless internal

loading is reduced to as low a level as possible the efforts to control external loading using the TMDL process will be compromised. Research in Lake Elsinore has shown that high levels of DO (5-10 mg/L) are needed to fully suppress the release of soluble phosphate and ammonia (Beutel, 2000). This work confirms existing practices in lake management.

- The most important beneficial use impairment in Lake Elsinore is lack of water. Supplementation with reclaimed make up water containing some nutrients now occurs but was predicated on a 1:1 swap of nutrient suppression in the sediments for nutrients added in the reclaimed water. The amounts were agreed at a meeting of all parties (City of Lake Elsinore, Professors Anderson and Horne). Nutrient suppression in the sediments requires a DO of at least 5 mg/L in water measured 1 meter above the lake bed.

  A numeric target of 5 mg/L is suggested for both deep and shallow surface waters of both Lake Elsinore and Canyon Lake.

Numeric targets for nitrogen and phosphorus

The proposed targets in the draft TMDL for phosphorus are 100 ug/L (2009) and 50 ug/L (2019) both measured at total phosphorus (TP). The equivalent standards for nitrogen at 1,000 ug/L (2009) and 500 ug/L (2019) measured as total nitrogen (TN). The TP target is predicated on a supposed phosphorus limitation for algae growth in the lake and the TP standard is based on a 1:10 ratio of P:N.

The use of TN and not TIN to derive a N:P ratio inevitably biases the ratio to show phosphorus limitation. A more rational ratio of TIN: 80% TP should be used to determine if there is a relative shortage of P or N. Such a difference is not academic. The reduction of N or P from the watershed requires very different emphasis and technologies. Reduction of N or P in the lake may also require different methods. In addition the reduction of N and P is best done in parallel with TIN and TP being kept at a constant 10:1 ratio. Use of TN to TP will obscure the balance in the desired ratio and provoke increased growths of possibly toxic blue-green algae (cyanobacteria).

Algal growth in Lake Elsinore is limited by light and CO_2, not nitrogen or phosphorus as stated in the draft TMDL.

Light limitation. At present it is unlikely that the lake is limited by any "conventional" nutrient such as nitrogen or phosphorus. Thus TMDL targets based on N or P concentrations are one step away from reality. Light is probably the most limiting factor for most of the day and carbon dioxide likely limits growth in the afternoon when pH rises due to depletion of CO_2. The recent summer chlorophyll *a* concentration of > 300 mg/m^2 (>300 ug/L (2000-02, see Draft TMDL appendices) exceeds the theoretical aerial maximum chlorophyll *a* value of 250 mg/m^2 even if the lake was only 3 feet deep. The high chlorophyll in the upper water uses up all the biologically usable light and thus the

deeper algae are effectively in the dark and cannot photosynthesize. When the wind blows surface algae are mixed down and deeper ones mixed up so, unlike flowers shaded by trees, they do not die. However, overall growth, productivity and potential oxygen demand in the sediments and in the water at night are still limited by available light, not nutrients.

Thus with the current average depth of about 12 feet (3.5 m) there is far more algal pigment than can be efficiently used. The current value is approximately 1,000 mg/m^2 or four times the theoretical maximum. Even if the chlorophyll falls to levels found earlier at higher water levels (100-150 ug/L) the same high aerial value will occur since the lower pigment will be spread over a deeper water column. At these higher water levels (~ 25 feet or 7.5 m) the lower chlorophyll per volume still integrates into over 900 mg/m^2, almost identical to the current aerial values at lower water levels. At some deeper depth the mixing of deeper water will be small (see Anderson's Appendix in the draft TMDL) and chlorophyll values will fall in deep water so that the integrated column number falls. However, the decline will still put the aerial value well above the maximum and thus light will still limit algae growth in Lake Elsinore over all contemplated water depths.

Carbon dioxide limitation. At or even much below chlorophyll *a* levels of 100-300 ug/L (900 – 1,000 mg/m^2) the amount of dissolved carbon dioxide is not able to keep pace with maximum photosynthesis. Carbon dioxide will dissolve back into the lake each night so next morning algal growth can resume but this still means that the daily production rate is limited by light and carbon dioxide.

Given the rate of internal loading of both N and P and current concentrations of the soluble bioavailable forms of these two elements it is doubtful if the target concentrations can be reached or, if reached will attain the decline in algae required to meet beneficial uses. For most lakes a minimum water transparency of 2 m (~ 6.5 feet) measured as Secchi disc depth is required. At this water clarity lifeguards could see the body of a drowning swimmer in much of the shoreline water. The current predictions of water transparency are in the range of 0.4 to 1 m (1.3 to 3.3 feet). The beneficial use improvement of water clarity increases of 1 to 3 feet are not obvious for a lake with many public beaches and good use potential.

Recommendation. Based on the above discussion it is recommended that the current policy with no fixed standards for the lake in terms of phosphorus and nitrogen be continued. Tightening the dissolved oxygen standard (see below) will provide a better protection of beneficial uses than the indirect N or P standards.

Increased dissolved oxygen standard

A standard for DO throughout the water column seems to be all that is required to protect beneficial uses at present. The method by which the DO is attained in perhaps best left to others than the Regional Board in the same way that the BOD in wastewater effluent is set by the board but the method of achievement is left to the treatment plant owners. The

climate seems to make a mockery of attempts to control the lake nutrient values. However, an increase in imported water to maintain the lake at a much higher level, regardless of the water source or nutrient levels (within reason) seems the optimum way to improved lake beneficial uses. It is noted that the water quality model developed by Professor Anderson shows a continual improvement in water quality as the lake depth increases (see Appendix B of the draft TMDL).

It is likely that fish kills in Lake Elsinore are due to low DO, in particular short nocturnal episodes in calm conditions followed by mixing. The force for mixing could either be wind or convection currents. Oxygen runs out in bottom waters when mixing of oxygen-rich water ceases or is slowed so that the demand for oxygen in the sediments exceeds the supply provided by vertical mixing. For almost any inflow of nutrients into this particular lake, there will be a high sediment oxygen demand (SOD). In turn SOD is Warm water fish in Lake Elsinore can escape low bottom water DO by moving to the surface. However, when the lake turns over with little bottom DO the entire water column can fall below 1.5 mg/L DO and large fish kills occur within minutes.

Adjusting the definition of N and P to reflect their use by nuisance algae

Nitrogen definition. The use of TN is not appropriate for lake water quality targets or models and will blur any efforts to determine cause and effects. Total-N includes the two main bioavailable forms of nitrogen (nitrate and ammonia + total inorganic nitrogen or TIN) but also the biologically unavailable form of dissolved and particulate N. For algae control it is the TIN that is important. The current approach uses TIN and its continuation is recommended. If TN is used instead of TIN the target will be meaningless since it is quite possible that the standard could be met but algae blooms would continue and vice versa. In Lake Elsinore the difference between TIN and TN is critical since most of the TN is organic nitrogen and very little is bioavailable TIN (draft report, Chapter 4, Table 4-2, footnote #7). If TIN were used instead of TN is it probably that the lake would become strongly N-limited (as is typical of eutrophic lakes) and that attempts to reduce bioavailable N and P in a 10:1 ratio would change the nature of the BMPs in the watershed if TMDLs were set based on the lake targets of N and P. For example, constructed wetlands in the watershed are an excellent and inexpensive way to reduce nitrate (e.g. Santa Ana River or San Diego Creek) while it is much more difficult to reduce phosphate or TP with such wetlands (e.g. Florida Everglades protection wetlands project). Conversely, it is relatively easy to reduce TP loading with detention ponds in the watershed but hard to remove nitrate with such devices.

Phosphorus definition. In contrast TP is a usable standard so long as the TP does not contain much unavailable P (usually apatite, calcium phosphate). The target should be amended to biologically available TP. The internal loading from the sediments is always soluble and biologically available phosphate and is thus covered by the TP designation. However, external loading may be mostly apatite washed in from erosion of the surrounding hills and creek banks. Tests are needed over several storms to assess the percentage of inflowing TP that is biologically available.

Difficulty of setting TMDL targets in Lake Elsinore.

The levels of nutrients specified as target amounts are probably too low for realistic implementation in a lake with such a high ratio of lake surface to drainage. Lake Elsinore has a ratio of 167 (3,000 to approximately 500,000 acres) and lakes with ratios over 1: 40 are generally eutrophic. Certainly ratios in excess of 1:100 are almost certainly eutrophic. Note that the management of the lake that reduced that lake surface area by 50% also increased the likelihood of eutrophication.

The ratio of watershed to lake area can be combined with the depth of the lake (> 30 feet) to indicate morphometrically eutrophication. Lakes with water depth less than 30 feet are normally polymictic that is the water is mixed top-to-bottom every few days or weeks even in summer. The draft TMDL notes such a condition in Lake Elsionore and it is part of the model in Appendix 2. Given the large drainage basin nutrients flow into the lake in large amounts. Given the shallow depth and polymixis, the nutrients grow algae in large amounts. Only by diverting the light or the nutrients into less nuisance forms can the beneficial uses of Lake Elsinore be achieved. It is likely impossible to reduce the nutrients sufficiently in the watershed to achieve the beneficial uses set by the board. The beneficial uses are unnatural and can only be achieved by other means than classical TMDLs.

However, the existing beneficial uses can be achieved by other methods, primarily by lake management. The potential methods were given in the February 2002 EVMWD NPDES Permit document (Montgomery Watson Harza, Pasadena Office). Most importantly good water clarity (> 2 m Secchi depth) is only achievable with biomanipulation that requires a relatively stable water level. The draft TMDL document will provide only ~ 0.5 to 1 m Secchi depth even if the TMDL targets are reached. A Secchi depth of 0.5 to 1 m is not an acceptable value for public water contact recreation.

Fish kills not clearly related to water depth in partial contraction to the draft TMDL

Fish kills are the second most important factor in the beneficial use impairment in Lake Elsinore after water level maintenance and prevention of the lake drying out. The draft TMDL correctly states that the fish kills are primarily due to low dissolved oxygen (DO) levels in the lake. However, the statement in the TMDL that "...it appears that fish kills coincide with either very shallow lake levels or high flows from the watershed due to heavy rainfall events." However, the evidence provided (Table 3-1) does not fully reflect the most pertinent data and is open to alternative interpretations. Such an alternative is presented below. In particular it should be noted that although the draft EIR is correct in the statement quoted earlier "...it appears that fish kills coincide with either very shallow lake levels or high flows from the watershed due to heavy rainfall events" is only part of the story. It is also true that low lake levels that "caused" fish kills often did not result in large fish kills even in adjacent years. Other factors seem to play the more important role and such factors include nocturnal convection. The distinction is

important since different cures are needed for low water; nocturnal convection or other possible causes of the fish kills in the lake.

Data for the most recent years 1991-98 when the lake was in its current much reduced form but still with a full range of water depth is shown in Table 1. This table shows no good relationship between water levels and fish kills in Lake Elsinore. Date for earlier years (Appendix Table A-1) supports this finding in general. Fish kills occurred at high, low and intermediate water levels. Large fish kills did occur at very low water levels in the1986-92 drought but similar low lake levels, often in adjacent years, did not result in large fish kills. High lake levels resulting from recent high inflows were also not reliable predictors of fish deaths, in contradiction of the statements in the draft TMDL. Between 1982 and 2002, in water less than 17 feet, major fish kills occurred only 20% of the time. In water greater than this depth (18-33 feet) major fish kills occurred 14% of the time. If the very shallow waters of the 1987-92 drought are excluded, fish kills of some kind occurred in 38% of years, all of these being in water over 17 feet deep. Thus the evidence tends to suggest that shallow water is not a critical item in fish kills in the lake. Of course if the water became very shallow, a few feet, the fish may run our of food or be crowded into such a small area that fish kills would occur. However, this has not been the case for the past few decades.

Table 1. Lake Elsinore: Surface elevation, water depth, dissolved oxygen and reported fish kills 1991-98.

Year	Max. depth (ft)	Fish kill estimate	Lake level
1991	8	Large	Very low
1992	7	Small	Very low
1993	33	Large	Very high
1995	32	Small	Very high
1996	27	Small	Desirable*
1997	23	Small	Desirable
1998	29	Medium	High

* Desirable is an agreed range of water depths.

Overall, the lake levels in Lake Elsinore, California do not seem to have had a predictable effect on fish kills. Even at very low water levels (< ~1233 feet or maximum depth < 10 feet), large fish kills occurred only 2 out of the 4 recent years of record. Since the early years of the 1989-92 drought did not produce large fish kills, the deaths cannot be due to the simple squeezing together of large numbers of fish as the lake diminished in volume. Therefore another mechanism must operate along with the low water levels in order to result in large fish kills (see Table 2). In this table lake volume is used as an alternative to lake level and the amount of algae present (surrogate for simple oxygen depletion or excess eutrophication) is shown. It can be seen that fish kills were primarily due to some other factor than lake volume (lake level) or algae blooms (oxygen demand). Thus there is not clear relationship between algae blooms and fish kills. The lack of relationship is critical since the TMDL which attempts to control algae blooms via nutrient reductions. The evidence presented here is that such a control will be erratic and tentative and

APPENDIX A. LAKE ELSINORE: FISH KILLS AND WATER DEPTH

Table A-1. Lake Elsinore: Surface elevation, water depth, dissolved oxygen and reported fish kills for 1982-2000. Equal attention to fish kills was probably not given to all years, especially higher water years 1982-87. However, the medium and large kills noted in the period 1991-98 would probably have reported. Data from Montgomery-Watson, 1997, Santa Ana Regional Water Quality Control Board, 2000, Riverside County Flood Control & Water Conservation District, 2001

Year	August Lake elevation ft	Max depth ft	Max depth m	DO < 1 mg/L at bottom	Fish kill M-W	Fish Kill RWQC B	Gen lake level	Mean depth, ft
1982	1251	28				No report	High	
1983	1260	37				No report	Very high	
1984	1252	29				No report	High	
1985	1248	25				No report	Desirable	
1986	1245	22				No report	Desirable	
1987	1241	18				No report	Desirable	
1988	1237	14				No report	Low	
1989	1233	10				No report	Low	
1990	1231	8		July-Aug	July-Aug	No report	Very low	
1991	1231	8		Mar-Ap, Oct	No	Large	Very low	
1992	1230	7		Aug	July-Aug	Small	Very low	
1993	1256	33		Aug?*	No	Large	Very high	
1994	1252	29		Sept	No	No report	High	
1995	1255	32		Aug	June-July	Small	Very high	25
1996	1250	27				Small	Desirable	
1997	1246	23				Small	Desirable	
1998	1252	29				Medium	High	
1999	1247	24				No report	Desirable	
2000	1243	20				No report	Desirable	
2001	1239	17				-	Desirable	

* No data reported for mid-summer, but DO 2 mg/L in July as in previous years when DO < 1 mg/L in August.

perhaps fish kills could more efficiently be reduced by other methods than TMDL implementation. However, there may be other reasons for the TMDL than fish kill reductions.

Table 2. Some statistics on oxygen conditions, oxygen demand and volume as related to fish kills for Lake Elsinore in the period 1990-96. Data from Montgomery-Watson (1997).

Date	Initial DO mg/L	Final DO mg/L	Duration of low DO days	Oxygen demand mg/L/d	Approx. lake volume (10^6 m^3)	Mass based oxygen demand tons/day	Fish kill
July-Aug 90	6	0	60	0.10	35	3.4	X
March 91	7	0	30	0.23	35	8.1	
July-Aug 91	9	0	100	0.09	35	3.2	
Feb 1992	14	9	30	0.17	100	17	
March 92	9	6	30	0.10	100	10	
July-Aug 92	6.5	2	60	0.08	100	8	X
Mar-April 92	16	8	45	0.18	100	18	
Jun-Aug 94	8.5	2.5	90	0.07	100	17	
May 95	14.5	6	30	0.28	110	31	
June-July 95	9	3	90	0.07	110	7.3	X
June 96	10	5.5	30	0.15	92	14	

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Flex your power!
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June 4, 2004

Xinyu (Cindy) Li
Santa Ana Regional Water Quality Control Board
3737 Main Street Suite 500
Riverside, CA 92501-3348

Dear Ms. Li

We appreciate the opportunity to comment on the Technical TMDL Report for nutrients for Lake Elsinore and Canyon Lake in the San Jacinto watershed. The Department strongly supports the efforts to protect the environment and achieve the best possible water quality possible. However, the Department does have concerns about portions of the report. Our main concern is this TMDL would require the construction of treatment controls, not yet developed, however the benefits has not been demonstrated to justify the cost.

The Department notes that the first documented case of a fish kill in Lake Elsinore occurred in 1933, and they may have occurred previously. In addition, algal blooms have been noted since the early 20th century. This was long before urban runoff was a significant contributor to the phosphorus inputs to this system. The 1933 fish kill occurred shortly after completion of the dam that formed Canyon Lake. The creation of Canyon Lake and diversion of water from the San Jacinto River into Mystic Lake have severely reduced the freshwater inflows to this system and have undoubtedly contributed to the current conditions. The data presented in the TMDL also indicate that many of the fish kills have occurred when the lake elevation was low.

As stated in the report the source analysis demonstrates that during the summertime, the predominant source of nutrients causing eutrophication is the internal loading from sediments. This sediment has been present in the lake since historical times and could not have been substantially derived from urban or highway runoff.
This long historical record of algal blooms and fish kills indicates that Lake Elsinore may be naturally eutrophic and that urban and highway runoff may not have contributed to any substantial change in the water quality of the lake. The historical record also indicates that the WARM designated use has not been maintained continuously (the lake being dry for almost 10 years in the 1950's and 1960's) and may not be achievable at all times in the future even with efforts on the part of dischargers to reduce their contribution of nutrients to the lake.

The Department is concerned to see that an allowable phosphorus concentration of 0.5 mg/L will be allowed in recycled water that will be used to maintain the elevation of Lake Elsinore. The proposed TMDL indicates that stormwater runoff must ultimately have a concentration of less than 0.05 mg/L.

The concentration in urban runoff would be one tenth that allowed in recycled water, which is produced in an advanced treatment plant operated and manned continuously. It is unreasonable to expect that currently available technology used for stormwater treatment on an intermittent basis and without operators could possibly achieve this level of performance. The average phosphorus concentration from highway runoff is 0.28 mg/L. There is currently no conventional treatment BMP that can reduce phosphorus to the proposed concentration of 0.05 mg/L. Advanced treatment would need to be considered at a great cost. This TMDL has not demonstrated the benefit would justify the cost.

The report proposes a numeric target for Total Phosphorus of 0.1 mg/l to be attained by 2015 and 0.05 mg/l to be attained by 2020 for both Canyon Lake and Lake Elsinore. The report proposes a numeric target for Total Nitrogen of 1 mg/L to be attained by 2015 and 0.5 mg/L to be attained by 2020 for both Canyon Lake and Lake Elsinore. The total inorganic nitrogen target is substantially lower then the target currently in the Basin Plan, 8 mg/L for Canyon Lake and 1.5 mg/L for Lake Elsinore.

The Department also notes that there is little it can do with regard to source controls. Our construction projects often require soil stabilization (erosion control) measures, which include the use of fertilizers (typically compost). Eliminating or reducing these fertilizers would, however, increase the probability of erosion due to inadequate vegetative cover. In so doing, there would then be an increase in the risk of discharging soil-borne nutrients (not to mention the other detriments of sediment discharge).

We are concerned that there is a need to examine the cumulative cost and technical implications of this TMDL combined with possible future TMDLs in the Region. The problem we see is that while some initial TMDLs may be fundable, the full set of TMDLs may be far beyond available resources. Our related concern is that controls implemented for the initial TMDLs may not be compatible with subsequent TMDLs. For example, the available data indicates that urban runoff typically exceeds standards for a number of constituents including trash, sediment, and metals. The initial TMDL is for nutrients, if it is determined that waterways are impaired by other substances, then additional TMDLs will be prepared. It is possible that the controls required for later TMDLs may not be compatible with the controls implemented for the initial TMDLs. Clearly, what is needed is a watershed approach that examines and prioritizes the overall water quality needs and assesses the financial feasibility of achieving these goals.

The Department is willing to partner with municipalities or other agencies on a pro rata basis to implement measures that are technically feasible and justifiable economically. The Department owns and maintains approximately 132.4 miles of roadway and three maintenance stations in the San Jacinto watershed. The total area of this right-of-way is approximately 2,400 acres, which is approximately 0.5% of the watershed.

Michael Josselyn, PhD, PWS
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July 29, 2004

Hope Smythe, Chief
Inland Waters Planning Section
Santa Ana Regional Water Quality Control Board
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RE: Draft TMDL for Nutrients in Lake Elsinore and Canyon Lake

Dear Ms. Smythe:

The purpose of this letter is to provide the Board with my peer review of the Draft TMDL for Nutrients in Lake Elsinore and Canyon Lake. As background information on my qualifications, I am a Professor Emeritus of Biology from San Francisco State University where I taught Biology, Limnology, Estuarine Ecology, and Wetland Ecology for over twenty years. I am currently a private consultant. I have served on a number of scientific advisory panels to state and federal agencies including the EPA, Corps of Engineers, and the National Research Council. I am currently a member of the Technical Advisory Committee for the City of San Francisco Wastewater Treatment Program, the Scientific Advisory Panel for the southern California Wetland Recovery Project, the Science Team for the South San Francisco Bay Restoration Project, and the Scientific Advisory Panel for the Calleguas Creek Watershed TMDL program. I have also conducted previous reviews of TMDL programs for the Upper Newport Bay. Though unrelated to this particular task, I have visited both Canyon Lake and Lake Elsinore and am familiar with the watershed.

In preparation of this review, I have read the following documents:

- Summary of the Proposed Lake Elsinore and Canyon Lake Nutrient TMDL
- TMDL components–Scientific and Technical Issues for Peer Reviewers
- Lake Elsinore and Canyon Lake Nutrient Source Assessment–Final Report
- Internal Loading and Nutrient Cycling in Canyon Lake
- Internal Loading and Nutrient Cycling in Lake Elsinore
- Lake Elsinore and Canyon Lake Nutrient Total Maximum Daily Loads

- Resolution R8-2004-0037

In the document related to Scientific and Technical Issues for Peer Reviewers, a number of questions were asked related to the documents. This letter follows the format of that request.

Numeric Targets

Are the proposed nutrient-related numeric targets for both Canyon Lake and Lake Elsinore appropriate and scientifically defensible?

The proposed targets for the Lake Elsinore and Canyon Lake TMDLs are contained in the draft resolution (Table 5-9n) and on page 17 (Table 4-1) of the Technical Report. Interim and Final concentrations for Phosphorus, Nitrogen, Chlorophyll a, and Dissolved Oxygen are provided. I concur with the finding that phosphorus is the limiting nutrient for both lakes and that controlling this nutrient will have the most substantial influence on algal growth in the water column. A nitrogen TMDL is proposed to reduce potential ammonia toxicity. It may be more appropriate to propose such a TMDL for ammonia rather than for nitrogen.

While lower levels of phosphorus than proposed are generally preferrable, I concur with the statements that the lake may be naturally eutrophic given the observations of fish kills previously and the terminal nature of the Lake in this watershed. The targets for phosphorus as proposed reflect both the "natural" eutrophic nature of Lake Elsinore, the reality of the high levels of phosphorus regeneration from the sediments, and the practicalities of trying to "treat" sediments *in-situ*. The shallow nature of the lake leads to wind resuspension [a major source of phosphorus regeneration] that cannot be controlled. However, the reduction proposed (25% percentile) relies on the untested use of aeration to maintain dissolved oxygen levels (see page 61) and the Anderson (2001) study suggests that significant SRP release occurs under oxic conditions. Furthermore, the final standards for phosphorus rely on the use of alum treatments which have been shown not to be as long on average as staff suggest (10-20 years) and effectiveness can vary (Welch and Cooke 1999). Wind resuspension may also affect the ability of the alum layer to effectively cover the bottom. In my opinion, the reduction levels for phosphorus sought for Lake Elsinore rely significantly on proposals that have not been tested for their effectiveness in this particular situation. Chlorophyll levels for Lake Elsinore appear to be appropriately estimated from proposed P concentrations and from other TMDL's in eutrophic lakes. Dissolved oxygen levels are appropriate for aquatic life.

In summary, while the proposed Lake Elsinore TMDL's for phosphorus are desirable, it is not certain that the data or technology exist to reduce the level of internal recycling to reach those levels without major sediment removal.

Given the seasonal stratification that occurs in Canyon Lake, I am in agreement that reduction in loading from external sources would be more effective in controlling phosphorus levels.

Does the technical staff report adequately demonstrate that these targets would be protective of beneficial uses in Canyon Lake and Lake Elsinore?

The technical staff report cites warm freshwater aquatic habitat and water and non-water contact recreation as the beneficial uses impaired by the nutrient levels. I concur that if oxygen levels can be maintained at higher levels (which is also directly related to eutrophic conditions), the levels that are specified could protect those uses. The substantial fish kills that have been observed are evidence of the impairment; however, it is not clear how other compounds or physical factors (high temperature, stratification) capable of having toxic effects on fish are also playing a role in those fish kills. My observations at these two lakes; however, support a conclusion that excessive algal growth is a significant factor affecting both fisheries and human water contact. Therefore, the standards proposed for phosphorus should be most appropriate for controlling algal growth.

Source Analysis

Are the estimates of external and internal nutrient sources scientifically defensible?

The studies by Anderson (2001) and Anderson and Oza (2003) are well documented and employ scientific methods and analyses that are highly defensible. I found those studies very well done. There is less information on the external sources as no flows were monitored during the most recent period when in-lake studies were being undertaken. Therefore, a simulation model was used and the staff appropriately noted that additional data will be needed to calibrate this model in wet years. Given that statement, I concur that the estimates using the LSPC model is the best approach available at this time.

Is the weighted average external nutrient loading approach scientifically defensible? Given data constraints in the technical report, is there an alternative approach that would address the concerns, described above, that motivated the proposed application of the weighted average approach?

High flow events can introduce a significantly different loading to both lakes as shown in Figures 5-18 and 5-20. The weighted average approach is a method to set standards by looking at the frequency of occurrence of each hydrologic event. Loadings would have to be established after a water year is completed, if separate loading criteria would set for each water year. Therefore, from a practical standpoint, averaging is proposed. However, given that external loading is often only a factor during wet years, it may be more desirable to set the loading criteria on the wet year source model results.

Linkage Analysis

Was the model approach employed for both nitrogen and phosphorus appropriate?

Staff relied on a nutrient mass balance model for developing standards. These models are relatively simple and is probably appropriate for Lake Elsinore, a terminal lake. I do not have an opinion about its appropriateness for Canyon Lake.

Is the derivation of the proposed nitrogen and phosphorus TMDL targets clearly explained and is the method employed scientifically defensible?

The proposed targets rely heavily on controls for internal nutrient cycling for Lake Elsinore which may not be achievable for practical and methodological reasons. The staff need to demonstrate that such technologies as suggested could actually work in this system. Otherwise, further reductions in external loadings may be required, though the they are relatively insignificant compared to internal sources. In addition, other options for controls on release of water from Canyon Lake in wet years should be explored such as wetland treatment ponds.

External source controls for Canyon Lake are clearly explained and the methods for affecting them are better known and available.

In light of the data constraints identified in the technical report, is the use of the weighted average external nutrient load capacity approach scientifically defensible?

At this time, until addition data can be developed for wet years, I believe this method is the most practical. However, I see that the most significant source of nitrogen and phosphorus to Lake Elsinore during wet years is export from Canyon Lake. Therefore, the source control would be much more difficult given sediment concentrations in Canyon Lake that might be resuspended during a wet year event. The proposed sediment dredging for Canyon Lake might reduce this potential loading source to some unknown degree.

Wasteload Allocations/Load Allocations

Is the method used to derive the WLA's and LAs scientifically defensible?

I believe that the methodology used is a standard approach used in establishing WLA's and LA's in other TMDLs.

Is it appropriate to specify the allocations as 10-year running averages?

Yes, because a 10 year period would capture the various hydrologic events ranging from dry to wet years.

Is it appropriate to specify allocations based on weighted average external load capacity?

Given the potential variation from year to year and the difficulty of regulating on a year-to-year basis, the weighted average method is the most practical approach.

Margin of Safety/Critical Conditions

Is the justification for the implicit margin of safety appropriate and clearly explained in the technical staff report?

The staff made conservative assumptions throughout their analysis and therefore incorporated the margin of safety within these assumptions. As stated above, the role of internal nutrient cycling is significant for both lakes and external loading is a seasonal event. The proposed reduction will require a substantial undertaking in controlling external sources and implementing promising, but not yet locally demonstrated, technologies to remove a very large source of nutrients.

Are the critical conditions identified and appropriately addressed in the staff report?

Yes.

Implementation

Are there additional implementation elements or studies that are necessary or recommended to fill in the data gaps and fine tune the TMDL?

The most important will be calibration of the LSPC model with actual conditions during wet years. The model, while a very useful tool, has not been specifically developed to deal with the climatic situation in the arid west and is not specific to the soil conditions of this watershed. Staff propose to continue to collect data and to adjust the standards as these data become available.

References

Welch, E.B. and G.D. Cooke. 1999. Effectiveness and longevity of phosphorus inactivation with alum. J. Lake and Reserv.Manag.15:5-27.

I hope that these comments are useful and please call me with any questions. In general, I found that the supporting information developed for the TMDL's was scientifically valid and well done. I am impressed with the work that was completed by Dr. Anderson and believe that this work has generated substantial information appropriate for setting TMDL's. The models that were used in analyzing the watershed and the loading are appropriate to this type of regulatory setting. I believe that the staff have appropriately dealt with the data gaps inherent in such watershed studies. Additional work will need to be done, especially for wet year events.

Sincerely yours,

Michael Josselyn, PhD, PWS
Professor Emeritus

EASTERN MUNICIPAL
WATER DISTRICT
SINCE 1950

June 28, 2004

Mr. Gerard J. Thibeault, Executive Officer
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3339

Subject: Comments on TMDL Report for Lake Elsinore Nutrient Loads

Dear Mr. Thibeault:

Eastern Municipal Water District (EMWD) is a vital stakeholder in the Lake Elsinore watershed and an integral discharger of supplemental water to Lake Elsinore. As a vital stakeholder, we support the scientific process to determine the causes of eutrophication and fish kills in the lakes, but have reservations about the relevance and economic justification in the draft TMDL. Our comments are as follows:

1. We would like to encourage that the pilot program for the discharge of recycled water to Lake Elsinore be extended beyond the current expiration date of December 1, 2004. We believe that the use of recycled water has significantly contributed to the stabilization of lake levels. There has only been a limited study by UCR on the effects of recycled water on the lake and an extension of the pilot study would allow for additional gathering of data to try to better understand the dynamics of the lake.

2. EMWD requests that an economic analysis be performed on the proposed targets, not only for recycled water but for other targets as well. The EPA Region 9, Guidance for Developing TMDLs in California states that the "numeric water quality targets for TMDL must be identified, and an adequate basis for the target(s) as interpretation of water quality standards must be specifically documented in the submittal." The District does not believe that the numeric targets set have an adequate basis and setting this numeric target is premature. As stated in the prior comment, the pilot project for using recycled water as a supplemental source has not been implemented for a sufficient period of time.

Mailing Address: Post Office Box 8300 Perris, CA 92572-8300 Telephone: (909) 928-3777 Fax: (909) 928-6177
Location: 2270 Trumble Road Perris, CA 92570 Internet: www.emwd.org

The District further believes that these proposed targets are, in essence, water quality objectives. As such, the Porter-Cologne Act requires that economic considerations be taken into account when establishing water quality objectives.

3. The proposed nutrient reduction targets for recycled water from EMWD's treatment plants cannot be achieved on a consistent basis and not without great costs. Extensive modifications to EMWD's treatment plants would have to be implemented to attempt to achieve the interim nutrient targets of 1.0 mg/l for total inorganic nitrogen (TIN) and 0.5 mg/l for phosphorus. The combined discharge quality from our plants is estimated to be 8.0 mg/l for TIN and 2.0 mg/l for phosphorus.

   The costs of plant modifications to reach the current proposed targets for recycled water discharges to Lake Elsinore are substantial - approximately $37 million for our Temecula treatment plant alone. In addition, these costs would be mandated since these targets would be incorporated into EMWD's revised NPDES permit.

4. Rather than having specific nutrient reduction targets mandated for each stakeholder, we would prefer that all the stakeholders and the Regional Board work together so that resources can be directed to the appropriate areas to achieve nutrient reductions for the least amount of costs.

Thank you for the opportunity to participate in the TMDL process. Should you have any questions, please contact Jayne Joy at (909) 928-3777 ext. 6241 or David Morycz at ext. 6325.

Sincerely,

Anthony J. Pack
General Manager

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MORENO VALLEY
1st in Family Recreation

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HAS 6/4/04

June 4, 2004

Gerald J. Thibeault, Executive Director
California Regional Water Quality Control Board
Santa Ana Region
3737 Main Street, Suite 500
Riverside, CA 92501-3348

SUBJECT: NUTRIENT TOTAL MAXIMUM DAILY LOADS (TMDL) FOR LAKE ELSINORE AND CANYON LAKE

Dear Mr. Thibeault:

The City of Moreno Valley appreciates the opportunity to comment on the proposed nutrient TMDL model for Lake Elsinore and Canyon Lake. We would like to commend Ms. Hope Symthe and Ms. Cindy Li for their dedication, patience, and determination in preparing the TMDL Technical Report and for leading the TMDL workgroup for the past four years.

Below are our general comments on Moreno Valley's current efforts to assist in the solutions to the regional water quality problems. Additionally, we have included our preliminary comments on the revised Technical Report and Attachments dated May 21, 2004 and released on May 25, 2004. Due to the short time frame available to review the report, Moreno Valley requests additional public review time be provided for this very important regional issue.

In general, Moreno Valley budgets more than $1.2 million a year for its NPDES program. This includes annual catch basin cleaning, bi-weekly street sweeping, commercial, industrial and construction inspection programs, illicit connection and discharge detection and administration including management and maintenance of extended detention basins and constructed wetlands in new developments.

Moreno Valley is very concerned that the water quality benefits (pollution reductions) derived from our current and past management and pollution control practices are not identified in the TMDL model. The model assumes these efforts either do not exist or was calibrated to include them in the background condition. Either way, Moreno Valley

does not receive the benefit of our proactive approaches designed to address these regional problems. Moreno Valley requests the TMDL model be calibrated to acknowledge these efforts and credit the pollutant load reductions as a result of these efforts to Moreno Valley.

Supplemental Water

Moreno Valley agrees and supports the concept that both lakes be stabilized for recreational uses and benefit of the cities of Lake Elsinore and Canyon Lake, including their inhabitants and users as addressed in Finding No. 9 of Order No. R8-2002-0008-A02 (EVMWD Discharge Permit) and Finding No. 7 of Order No. R8-2002-0009-A01 (EMWD Discharge Permit).

Moreno Valley does not agree however, with the TMDL model providing a Waste Load Allocation (WLA) (interim or final) for supplemental water. Moreno Valley believes approval of Order Nos. R8-2002-0008-A02 and R8-2002-0009-A01 usurped the TMDL process although the findings within the orders clearly acknowledged nutrient problems within Lake Elsinore. Notably, comments on the draft orders were not solicited from the majority of the TMDL stakeholders or the TMDL Stakeholder Workgroup which was formed on January 27, 2000, more than two years before adoption of the orders.

If a WLA is provided for discharge of supplemental water to the lakes it reduces the available load for the other stakeholders. In essence, by stabilizing the lakes' water surface elevations with supplemental (reclaimed for Elsinore) water for the benefit of Lake Elsinore and Canyon Lake, their inhabitants and users, without appropriate offsets or credits provided to the other stakeholders, the control costs are passed through to the other stakeholders. These stakeholders then must account for this WLA reduction by implementing additional controls measures at additional costs to their residents and businesses that do not share the economic benefit of the stabilized lakes. Moreno Valley does not believe this is the intent of the Board.

The direct and indirect costs of lake stabilization including any and all costs of removing any pollutants added to the water column via supplemental water should be internalized to the direct users and benefactors of the lakes, the City of Lake Elsinore, Canyon Lake and the water districts and excluded from the TMDL model. Simply put, this is a demand management issue. The users and owners of the lakes require clean water and a stable lake, therefore, they should be required to pay all the costs associated with adding nutrient rich water to the lakes. The WLA for supplemental water as currently modeled should be allocated to the other land uses. Any assignment of a WLA to supplemental water should be done through pollutant trading with the appropriate stakeholders.

Point Source vs. Nonpoint Source Pollution

In consideration of the Federal Clean Water Act (CWA), Moreno Valley is concerned that the Technical Report and Attachments identify Moreno Valley address nonpoint source pollution. Moreno Valley requests that the Technical Report and Attachments include the State/Federal responsibilities for management measures and other controls including adequate funding to address nonpoint source pollution and remove all references to Moreno Valley to support such activities/programs.

40 CFR 130.2(p) defines *Reasonable assurance* for point and nonpoint sources. "Reasonable assurance means a demonstration that TMDLs will be implemented through regulatory or voluntary actions, including management measures or other local controls, by Federal, State, or local governments, authorized Tribes or individuals." Reasonable assurance clearly identifies the responsible parties required to address TMDLs as further discussed below.

40 CFR 130.2(p)(1) addresses point source pollution. This section requires procedures to be implemented to ensure NPDES permits will be issued, reissued or revised as expeditiously as practicable to implement applicable TMDL WLA for point sources. Moreno Valley, as a local government, is permitted as a point source discharger under the 2002 Municipal Separate Storm Sewer System Permit for the Santa Ana River Watershed (point source permit).

Reasonable assurance for TMDLs established for nonpoint source pollution is addressed in 40 CFR 130.2(p)(2). 40 CFR 130.2(p)(2) requires a four-part test for nonpoint source pollution--the fourth part being that the TMDL will be supported by adequate water quality funding. 40 CFR 130.2(p)(2)(i) states in part, "Adequate water quality funding means that the State, Territory, or authorized Tribe has allocated existing water quality funds from any source to the implementation of the TMDL load allocations to the fullest extent practicable and in a manner consistent with the effective operation of **its** clean water program." Local governments are specifically and conspicuously excluded from 40 CFR 130.2(p)(2); therefore any task identified in the Technical Report and Attachments associated with nonpoint source pollution should be managed and funded by the Federal/State coffers as required by the Clean Water Act.

Atmospheric Deposition

Atmospheric deposition occurs throughout the watershed. Atmospheric deposition is a nonpoint source identified in the CWA. Moreno Valley, as well as the other stakeholders, does not have the ability to control atmospheric deposition in the

watershed just as the lake owners cannot control atmospheric deposition onto the lake surfaces. There is not sufficient justification in the model to exempt atmospheric deposition onto the waterbodies and continue to require the stakeholders in all other areas of the watershed to address atmospheric deposition in their WLA. Moreno Valley requests the total atmospheric deposition be calculated for the entire watershed, removed from the other land uses and include the load as a nonpoint source load allocation in the model.

In summary, Moreno Valley requests the current management and control practices of its NPDES program be calibrated into the TMDL model. Additionally, Moreno Valley requests nonpoint source pollution be addressed by the appropriate parties pursuant to the requirements of 40 CFR 130.2(p). Finally, Moreno Valley believes the science supporting the interim and final TMDL numeric targets in the Technical Report is preliminary and the cost to comply with the proposed numeric targets is so significant that they will be unachievable.

If you have any questions, please do not hesitate to call Kent Wegelin at 909.413.3497.

Sincerely,

for Gene Rogers
City Manager

GR/kw

C: Mayor and City Council
Bob Herrick, City Attorney
Trent D. Pulliam, Public Works Director and City Engineer
Thomas F. Breitkreuz, Enterprise Services Manager
Kent Wegelin, Storm Water Program Coordinator

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

June 3, 2004

Gerard Thibeault
Executive Officer
Santa Ana Regional Water Quality Control Board
3737 Main St., #500
Riverside, CA 92501

Dear Mr. Thibeault,

We wish to offer our support for adoption of the Lake Elsinore/Canyon Lake nutrients TMDLs and proposed Basin Plan amendment and provide some comments for your consideration. We urge the Regional Board to promptly adopt these TMDLs, consistent with the State's commitment in the State-EPA Performance Partnership Agreement to submit final TMDLs for these waters for EPA approval by 2005.

We have been working with Santa Ana RWQCB for several years on these TMDLs for Lake Elsinore and Canyon Lake. We have reviewed and commented throughout the TMDL development and implementation planning process.

The historical record demonstrates these waterbodies have been impaired since the early 20th century. The primary cause of observed fish kills is due to low dissolved oxygen, which corresponds with high algal productivity due to excessive levels of nutrients. The resultant decay of fish and algae also produce offensive odors, an unsightly lakeshore and thereby adversely affect beneficial uses of these two lakes. We hope the Santa Ana Regional Board will take action to begin to restore the water quality in Lake Elsinore and Canyon Lake and meet all designated beneficial uses. Indeed, the Regional Board has the legal obligation, pursuant to the Clean Water Act and federal regulations (40 CFR 130.7(c)), to establish TMDLs for 303(d) listed waters.

The TMDLs and Basin Plan amendment define interim and final numeric targets which are consistent with the existing applicable water quality objectives for Lake Elsinore and Canyon Lake. Our review of the proposed TMDLs indicates that they meet all federal regulatory requirements and will be approvable upon submittal to EPA.

We understand some stakeholders have suggested the use of concentration-based nutrient TMDL allocations. Federal regulations allow TMDLs to be expressed in terms of mass per time, toxicity, or other appropriate measures; nonetheless, we strongly support the Regional Board's proposal to define the TMDLs and allocations in terms of annual mass loads. This approach is technically appropriate given the long nutrient residence times in lakes and reservoirs and the fact that nutrient loads vary substantially

from year-to-year due to variability in water inputs to each lake. In other words, the desired water quality conditions are unlikely to be achieved using concentration-based allocations alone because they would permit massive nutrient loading into the lake sediments during moderate and wet years, which would then cause eutrophic and impaired conditions in moderate and dry years.

The Regional Board has developed flexible TMDLs using the best available information to date. The Basin Plan amendment outlines short- and long-term plans to address monitoring needs and improved hydrologic modeling. We recommend that pH monitoring of lake water column be included to elucidate ammonia concentrations relative to the water quality objective. The implementation plan also includes compliance schedules that are reasonable and provide adequate time for meeting the interim and final targets.

In closing, we commend the staff for developing a reasonable TMDL plan that is consistent with federal requirements and likely to result in timely attainment of water quality objectives in these water bodies. It is vital for the Regional Board to adopt this amendment without delay and proceed to begin implementing measures to attain water quality standards. If you have any questions concerning these comments, please contact Peter Kozelka, TMDL liaison to Santa Ana RWQCB, at (415) 972-3448.

Sincerely,

David Smith,
TMDL Team Leader